CONSTRUCTION TRENDS

Notes on significant movements in the construction industry

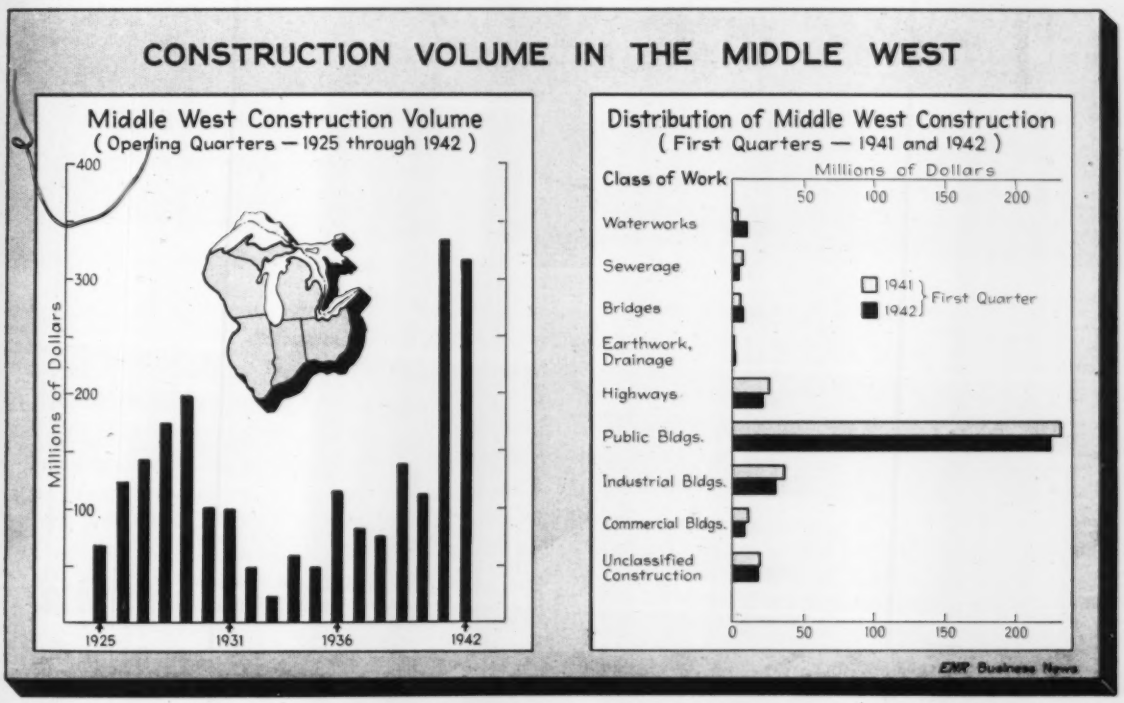
Middle West Construction Near 1941 Peak

MIDDLE WEST CONSTRUCTION volume reached $317,000,000 for the first quarter of 1942, a peak second only to the $331,000,000 reported for the corresponding period last year.

Approximately 87 percent of the near-record 1942 volume was publicly-financed construction. This compares with 91 percent in the nation as a whole. Consistent with the war program, the major portion of the public volume in this area was of federal origin. Of the $276,706,000 reported for public construction, $243,533,000, or 88 percent, was for federal work, and the balance, $33,173,000 was for state and municipal projects.

Private construction amounted to $40,506,000, or just over one-eighth of the Middle West's opening quarter total. The private volume was 21 percent below the period in 1941, but this was a creditable showing considering that private work in the United States for the first 1942 quarter dropped 52 percent below the preceding year. The outlook for private work is not bright, however, as the War Production Board has decreed the stoppage of all construction not considered essential in the prosecution of the war, and has further stated that the "go-ahead" signal on new industrial construction would be held up pending investigation to exhaust the possibilities of converting existing facilities.

Over 70 percent of the Middle West's opening quarter construction volume was concentrated in public buildings—war plants, military housing, war workers' housing, military buildings, etc.; 9.6 percent was in private industrial buildings; 6.3 percent in streets and roads; 5.9 percent in unclassified construction; 2.6 percent in commercial building and large-scale private housing; 2.4 percent in waterworks; 1.3 percent in bridge construction; 1.0 percent in sewerage plants and sewers; and 0.4 percent in earthwork and drainage structures.



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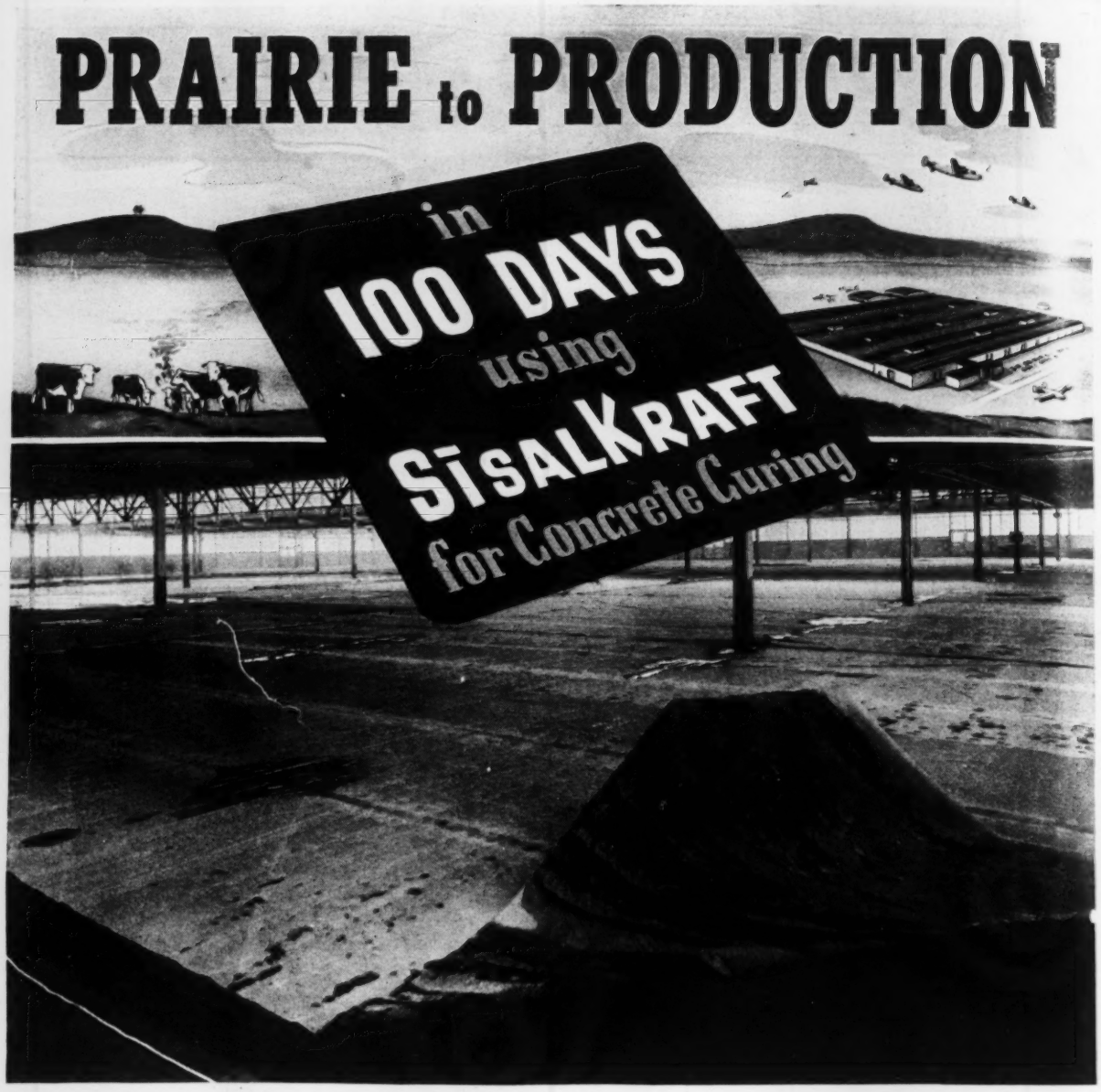

THIS big southwestern aviation factory is typical of huge arms plants throughout the country that are being rushed to completion in record time. And, as in so many others, SISALKRAFT is being used to cure the concrete floors . . . in this case, more than a million square feet.

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WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

VOL. 128 MAY 7, 1942 No. 19

THIS WEEK

• A revolutionary approach to the problem of "waterproofing" soil by the addition of Vinsol resin—its practical application in road stabilization work, and its limitations—is included in a comprehensive report in this issue on field experiments and laboratory test conducted by the Hercules Powder Company, producers of Vinsol resin.

• Consideration of means to save steel in reinforced-concrete construction has led to a new design method. It involves the use of higher unit stresses hitherto considered beyond the limits of practicality. An effective and safe design method for securing the advantages of higher stresses through a revision of the safety factor for dead load is outlined. (See p. 81.)

• An innovation in airport hangar construction, wherein collapsible steel-frame doors disappear below floor level into a 5½-ft. deep trench, giving a clear opening of 20½ x 100 ft. at each end, has been introduced at a civil flying school in Texas. Laminated-timber arches of 135-ft. span are used for the structural frame. Design details and construction features are described.

THINGS TO COME

• To meet demands for additional transportation facilities resulting from wartime activity in Chicago, the city is rushing to completion one section of it's subway project. How four different methods are being employed by as many contractors to solve station street decking problems forms the basis of an unusually interesting story to appear next week.

• War conditions having placed a premium on designs that use a minimum of steel, special interest is attached to studies concerning the relative amounts of reinforcing required in different types of concrete slabs and columns proportioned according to various building codes. The result of these studies will be included in the May 21 issue.

• An excellent example of engineer-contractor collaboration is vividly portrayed in an article scheduled for the May 21 issue. Here it is shown how severe handicaps were overcome in meeting unusual demands for speed in producing 300 war buildings on a limited site.

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Number of copies of this issue printed 36,898

QUICK STEEL
IN
RYERSON STOCK

Your nearby Ryerson plant carries reinforcing bars, wire mesh, structurals, roofing... and practically every form of construction steel and allied products . . . in stock for immediate shipment.

The demands of wartime, naturally, have limited our stock, but we are in a position to furnish steel for the war program and essential industries.

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Complete Facilities for cutting, bending or forming Reinforcing steels to specification.

Prompt Deliveries to meet your day-to-day job needs and keep materials coming on schedule.

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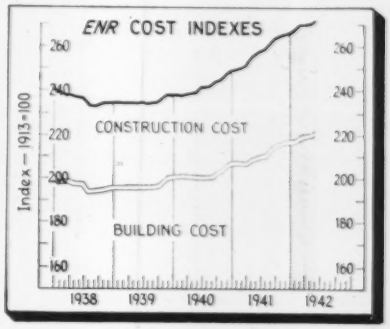
MONTHLY CONSTRUCTION BUSINESS SUMMARY

ENR CONSTRUCTION VOLUME AND NEW CAPITAL . . . FHA MORTGAGES

(,000 omitted)	April 1941 (4 wk.)	April 1942 (5 wk.)	% Change†	Four Months 1941 (17 wk.)	Four Months 1942 (18 wk.)	% Change†
Total Construction	$381,563	$898,696	+88.0	$1,842,811	$2,891,784	+48.0
Private Construction	121,863	63,732	−38.0	511,879	251,436	−54.0
Public Construction	259,700	834,964	+157.0	1,330,932	2,640,348	+87.0
Federal	157,092	768,928	+292.0	905,750	2,408,613	+151.0
Total New Productive Capital	$1,715,131	$1,039,367	−51.5	$3,047,784	$2,458,821	−24.0
Private Investment	68,604	40,253	−53.0	289,256	202,503	−34.0
Federal (non-federal work)	190	16,114	.....	39,691	31,363	−25.0
Federal (federal work)	1,646,337	983,000	−52.0	2,718,837	2,224,955	−23.0
FHA Mortgages Selected for Appraisal (Title II)	$150,884	$90,114*	−40.0	$474,813	$282,771*	−40.0

† *Adjusted for difference in number of weeks.* * *Preliminary.*



CONSTRUCTION COSTS . . . WAGE RATES . . . PRICES

	May 1941	May 1942	% Change	Change April to May 1941: April	1941: May	1941: %	Change April to May 1942: April	1942: May	1942: %
ENR Construction Cost Index, 1913 = 100‡	255.55	272.30	+6.6	252.40	255.55	+1.2	271.78	272.30	+0.2
ENR Building Cost Index, 1913 = 100‡	209.24	220.14	+5.2	208.60	209.24	+0.3	219.55	220.14	+0.3

‡ *Does not reflect increased costs due to more overtime, lower labor efficiency, delivery delays, etc.*

ENR 20-CITIES' AVERAGE

Common labor	$0.741	$0.788	+6.3	$0.725	$0.741	+2.2	$0.788	$0.788	0
Skilled Labor (Av. 3 trades)	1.490	1.542	+3.5	1.480	1.490	+0.7	1.541	1.542	+0.1
Bricklayers	1.569	1.645	+4.8	1.564	1.569	+0.3	1.645	1.645	0
Structural Ironworkers	1.569	1.602	+2.1	1.556	1.569	+0.8	1.602	1.602	0
Carpenters	1.332	1.379	+3.5	1.320	1.332	+0.9	1.376	1.379	+0.2
Cement, per bbl	$2.52	$2.60	+3.2	$2.52	$2.52	0	$2.60	$2.60	0
Rein. steel bars, per cwt	2.57	2.67	+3.9	2.56	2.57	+0.4	2.62	2.67	+1.9
Struct. steel shapes, base	2.10	2.10	0	2.10	2.10	0	2.10	2.10	0
Sand, per ton	1.18	1.19	+0.8	1.17	1.18	+0.9	1.21	1.19	−1.7
Lumber, 2x4 Fir, per M ft.	40.68	48.30	+18.7	40.59	40.68	+0.2	47.88	48.30	+0.9
Lumber, 2x4 Pine, per M ft.	37.49	42.82	+14.2	37.66	37.49	−0.5	42.29	42.82	+1.3
Brick, common, per M	14.55	15.41	+5.9	14.50	14.55	+0.3	15.33	15.41	+0.5
Ready-mixed concrete, c.y.	6.93	7.33	+5.8	6.94	6.93	−0.1	7.19	7.33	+1.9
Struct. clay tile, 3x12x12	74.49	76.72	+3.0	74.34	74.49	+0.2	76.62	76.72	+0.1
Paving asphalt, cars, ton	14.40	14.93	+3.7	14.29	14.40	+0.8	15.36	14.93	−2.8

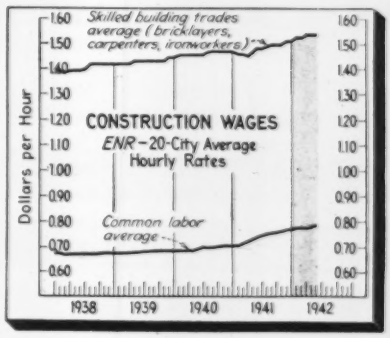
ENR INDEX NUMBERS

	Construction Cost 1913	Construction Cost 1926	Building Cost 1913	Building Cost 1926	Volume '13	Volume '26
Base = 100						
May, 1942	272.30	130.89	220.14	119.00		
April, 1942	271.78	130.64	219.55	118.68	569	249
Mar., 1942	269.71	129.65	218.88	118.32	578	253
Feb., 1942	269.41	129.51	218.44	118.08	507	222
Jan., 1942	267.63	128.65	217.12	117.37	402	176
Dec., 1941	266.16	127.94	216.37	116.96	217	95
Nov., 1941	266.13	127.93	216.54	117.05	282	124
Oct., 1941	264.46	127.13	215.92	116.72	263	115
Sept., 1941	263.12	126.48	214.58	116.00	419	184
Aug., 1941	260.41	125.18	212.45	114.84	434	190
July, 1941	258.18	124.11	210.22	113.64	635	278
June, 1941	256.79	123.44	209.41	113.20	492	216
May, 1941	255.55	122.84	209.24	113.11	275	121
April, 1941	252.40	121.33	208.60	112.76	322	141
1941 (Av.)	257.84	123.95	211.46	114.32	375	164
1940 (Av.)	241.96	116.31	202.81	109.64	269	118
1939 (Av.)	235.51	113.21	197.44	106.73	211	92
1938 (Av.)	235.86	113.34	196.83	106.40	197	86

MATERIAL SHIPMENTS . . . BUILDING PERMITS

	April 1941	April 1942	% Change	Mar. 1942	% Change Mar.-Apr.
Lumber (% 1935–'39 wk. seas. aver.) N.L.M.A.	136.5	147.0	+7.7	145.8	+0.8
Steel (% operating capacity) A.I.S.I.	97.4	98.2	+0.8	98.1	+0.1

	March 1941	March 1942	% Change	Three Months 1941	Three Months 1942	% Change
Fabricated Structural Steel, tons, A.I.S.C.	170,161	184,715	+8.5	496,105	512,901	+3.3
Cement, thous. bbl., U. S. B. of M.	9,915	12,733	+28.4	25,355	30,138	+18.8
Building Permits, Dun & Bradstreet (,000 omitted)	$137,954	$102,434	−25.7	$337,114	$253,322	−24.9



COST OF LIVING INDEXES AND EMPLOYMENT

	March 1941	March 1942	% Change	Feb. 1942	% Change Feb.-Mar.
Cost of Living Index, N.I.C.B.	86.3	96.1	+11.2	95.1	+1.0
Rent (Housing) Index, N.I.C.B.	87.7	90.7	+3.4	90.4	+0.3
Total Employment (est.), thous., B.L.S.	37,761	40,298	+6.8	39,995	+1.0
Construction Employment (est.) thous., B.L.S.	1,631	1,747	+7.1	1,645	+6.2

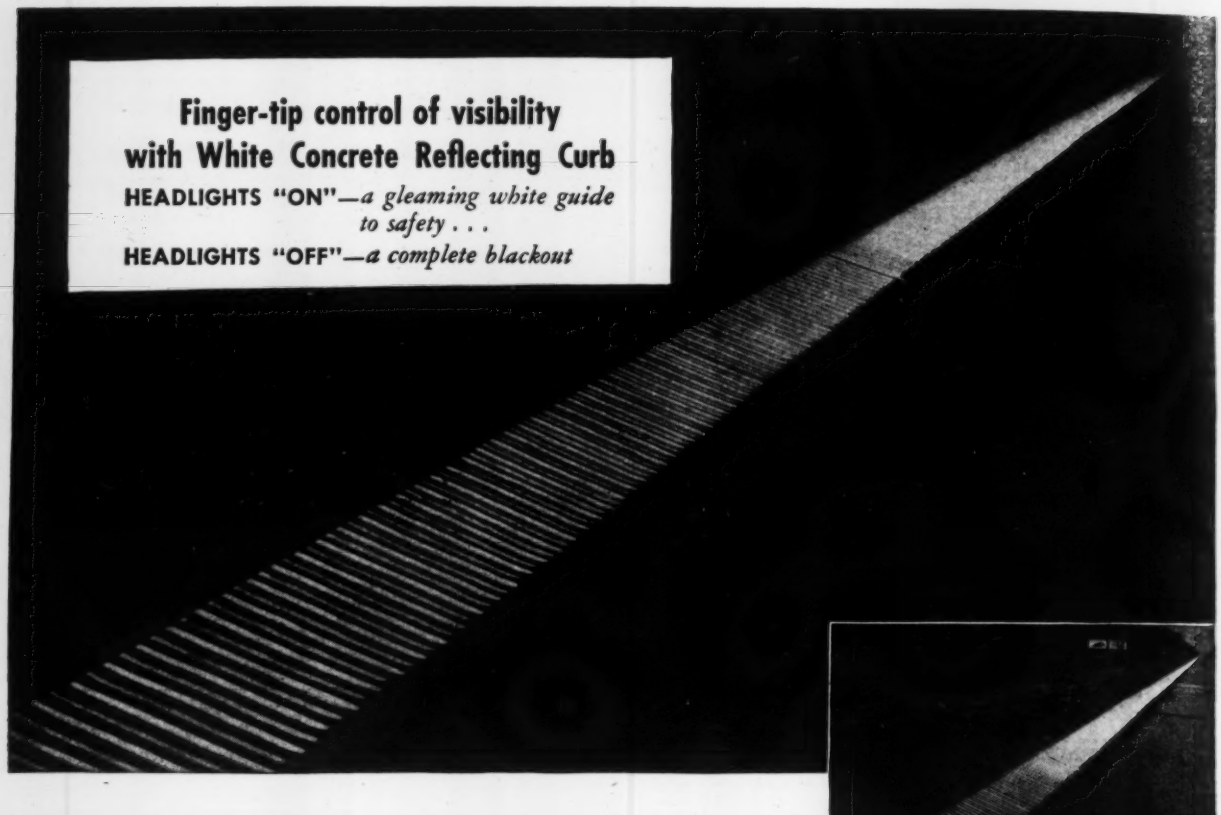
ENGINEERING CONSTRUCTION CONTRACTS——ENGINEERING NEWS-RECORD——APRIL, 1942

Engineering News-Record *reports projects of the following minimum costs — waterworks, excavation, drainage and irrigation,* $15,000; *other public works,* $25,000; *industrial buildings,* $40,000; *other buildings,* $150,000

Five Weeks — Thousands of Dollars (000 Omitted)

Public Works	New England	Middle Atlantic	South	Mid West	West of Mississippi	Far West	United States April 1942	United States Four Months 1942	United States Four Months 1941	Canada
Waterworks	767	2,777	3,152	127	2,381	546	9,750	35,464	28,838	360
Sewerage	113	1,533	665	1,875	2,932	1,096	8,214	29,682	38,527	50
Bridges, public	249	537	1,005	243	174	1,069	3,277	21,936	34,188	405
Earthwork and waterways	218	4,013	247	1	3,649	1,675	9,803	163,323	58,718	17
Streets and roads	1,221	5,590	15,817	5,177	11,183	9,828	48,816	134,577	185,366	1,382
Buildings, public	27,363	74,504	76,361	164,776	80,662	139,267	562,933	1,825,025	730,201	10,671
Unclassified, public	17,068	21,787	47,426	13,265	32,487	60,138	192,171	430,341	255,094	2,196
Total public	**46,999**	**110,741**	**144,673**	**185,464**	**133,468**	**213,619**	**834,964**	**2,640,348**	**1,330,932**	**15,081**
Federal government (included in above classifications)	50,807	89,029	119,242	180,425	131,489	197,936	768,928	2,408,613	905,750	.....
Private										
Bridges, private	.....	.....	.....	.....	.....	.....	.....	205	2,887	.....
Buildings, industrial	1,929	6,529	230	9,124	5,035	1,743	24,590	101,908	221,990	3,710
Buildings, commercial	8,015	8,748	1,845	4,730	2,560	7,095	32,993	124,298	206,036	1,600
Unclassified, private	298	765	2,575	1,590	672	249	6,149	25,025	80,966	155
Total private	**10,242**	**16,042**	**4,650**	**15,444**	**8,267**	**9,087**	**63,732**	**251,436**	**511,879**	**5,465**
Total Engineering Construction:										
April, 1942 — 5 weeks	**57,241**	**126,783**	**149,323**	**200,908**	**141,735**	**222,706**	**898,696**	.....	.....	**20,546**
March, 1942 — 4 weeks	29,671	96,233	168,621	99,961	251,794	83,205	729,485	.....	.....	14,825
April, 1941 — 4 weeks	27,787	120,616	43,040	48,427	64,464	77,229	381,563	.....	.....	18,751
Four Months — 1942	**126,803**	**442,313**	**665,024**	**518,120**	**606,433**	**533,091**	.....	**2,891,784**	.....	**52,266**
Four Months — 1941	108,430	456,720	332,838	379,498	313,851	251,474	.....	.....	1,842,811	61,487

HOW TO IMPROVE VISIBILITY
of strategic highways and access roads


Finger-tip control of visibility
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HEADLIGHTS "ON"—a gleaming white guide to safety . . .
HEADLIGHTS "OFF"—a complete blackout

Today, more than ever before, it is essential to provide adequate visibility on strategic highways and access roads. It is equally important to reduce highway accidents. White Concrete Reflecting Curb helps both, even under minimum lighting conditions. It depends upon headlight rays—no other illumination is needed—to provide visibility.

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With headlights "off," reflecting curb is completely blacked out. But a flick of the headlight switch and a continuous ribbon of light defines the highway for the driver, far ahead of the car.

THIRTY-TWO-PAGE BOOK, complete with photographs, illustrations, working drawings and specifications, tells the fascinating story of this new safety curb. Send today for a "A WHITE GUIDE TO SAFETY." Write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Bldg., New York City.

● In daylight this concrete reflecting curb made with Atlas White Cement dominates the highway. On a rainy night (top) it is a brilliant white guide to safety along the blacked-out roadway. Reason: The scored finish reflects car headlight rays directly back to the driver's eyes and the white concrete curb stands out in sharp contrast to the surrounding blackness.

OFFICES: *New York, Chicago, Philadelphia, Boston, Albany, Pittsburgh, Cleveland, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Birmingham, Waco.*

ENR-M-28

WHITE CONCRETE REFLECTING CURB
MADE WITH ATLAS WHITE CEMENT

The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • MAY 7, 1942 • VOLUME 128 • NUMBER 19

Expect road construction to be exempted from stop order

Move would clarify entire road priority situation and permit some jobs to go ahead. Blacktop repairs and new work restricted in East, remedies suggested.

A formal amendment to the construction stop-order, L-41 (*ENR*, April 16, p. 577) exempting all road construction from the terms of the order is expected to be issued soon. Although jobs requiring critical materials would, of course, still require an application for a priority rating in order to get the needed material; the effect of the amendment would be that road jobs using non-critical materials or for which material is already on hand could go ahead without asking permission of anyone.

It is possible that the whole highway priority situation may be simplified at the same time. A plan is now being pushed by which WPB would allocate definite quantities of steel and other critical materials to highway work. It would then, under this scheme, be up to the Public Roads Administration to decide where the allocated materials would be used. At present, road priorities are passed on by PRA, but they are issued by WPB, and there is no assurance that a rating once granted would actually get the material.

Blacktop restricted

This week, meanwhile, a fairly mild control was imposed over the use of tars and asphalts for roads in the oil-shortage area—seventeen Eastern states and the District of Columbia. The order, worked out by the Petroleum Coordinator and PRA, forbids use of these materials in surfacing driveways, yards and parking lots, and limits their use on roads to those designated as essential by PRA. Technically, the order is a voluntary recommendation, but the Department of Justice has permitted suppliers to govern their sales in accordance with it.

The definition of what road work is essential will be worked out to fit the available supply of asphalt and tar. If PRA finds that more of these materials are available than was previously estimated, probably it will be more liberal in its definitions. The procedure set up is that any agency—county, municipality, or state—fills out an application form, PRA-R-1, and submits this to the state highway department. If the department approves, it passes the application to the Public Roads Administration district engineer. If the road project possesses a priority rating the district engineer will grant an authorization for use of blacktop. Similarly, if the project obviously is minor, he will reject it. Marginal cases will be submitted to Washington.

Road maintenance

Maintenance presents something of a problem. It is intended immediately to allot sufficient quantities of material to keep maintenance crews going. Then, all road agencies will be asked to review their maintenance programs, putting them on the minimum basis required to get the roads through another season. Maintenance jobs of a routine nature should be omitted, in the opinion of the PRA, and appearance should be disregarded and patches used where possible.

In maintenance, and road work generally, use of tar is to be preferred to asphalt. Tar is produced locally (and the shortage is entirely a matter of transportation), storage space is limited, and certain acid by-products of tar are needed for the war.

States to which the restrictions apply are: Connecticut, Delaware, Eastern Florida, Georgia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, and West Virginia.

While the eastern seaboard highways thus face probability of deterioration, many schemes were being advocated last week to remedy the general oil shortage situation.

The National Rivers and Harbors Congress, which will hold its 36th annual convention at Chicago May 29 and 30,

Construction total hits all-time peak

Spectacular gains in war construction skyrocketed engineered construction volume to the highest peak in history during the past week. The week's total, $434,955,000, climbed 45 percent above the former high of $298,718,000 recorded for the week of July 10, 1941.

The volume was 138 percent higher than last week, and 502 percent above the corresponding week last year.

Public construction accounted for 96 percent of the week's total, and also established a new record. The public volume topped that of a week ago by 140 percent, and gained 753 percent over a year ago. Federal work was the prime factor behind the construction gains, and in reaching a new all-time high, increased 144 percent over the preceding week and 1,523 percent over the 1941 week. State and municipal construction was up 92 percent over a week ago, but was 12 percent below a year ago.

Private work more than doubled its last week's total, but was 26 percent lower than for the 1941 week.

The week's unprecedented construction volume brought the 1942 total to $3,326,739,000, an increase of 64 percent over the 19-week period last year. Public work, $3,048,112,000, was 106 percent higher than in the 1941 period as a result of the 181 percent gain in federal work. Private construction, $268,627,000, was 52 percent lower than a year ago.

Public buildings—war plants, barracks, defense housing, military structures, etc.—made up almost two-thirds of the week's total, and reached a new peak. Unclassified construction also climbed to a new pinnacle. In addition to these two classes of work, sewerage, bridges, industrial and commercial buildings, earthwork and drainage and streets and roads exceeded their respective volumes of a week ago; and waterworks, sewerage, industrial buildings, and streets

(*Continued on p. 59*)

announced that it would sponsor immediate expansion and utilization of the inland waterway system to transport petroleum products and other basic raw materials through safe waters. The Congress' program is expected to include: the immediate construction of an adequate fleet of barges and tow boats; immediate construction of an 82-mile pipeline and a barge canal across Florida from Port Inglis on the west coast to Palatka on the St. Johns River; deepening of the gulf intra-coastal waterway from 9 to 12 ft. with a new channel from New Orleans to Mobile.

Meanwhile, the westward flow of oil from three Pennsylvania pipelines, one of them delivering 20,000 barrels of crude from Philadelphia to Pittsburgh, will be switched to flow eastward shortly, oil men said last week. The three lines are the Keystone pipeline, from Philadelphia to Pittsburgh; the Susquehanna line, from Philadelphia to Cleveland, and the Tuscarora line in New Jersey and western Pennsylvania.

Near Eldorado, Ark., a 200-mile pipeline was under construction to carry oil from Eldorado to Helena, Ark. And J. R. Parten, director of transportation in the office of the Petroleum Coordinator, disclosed plans to increase the capacity of an oil pipeline from Baton Rouge, La., to Greensboro, N. C., now carrying what he said was less than two-thirds of its capacity.

Plans now being formulated call for construction of a new pipeline from the Texas Gulf coast to Baton Rouge and installation of additional pumping equipment on the Baton Rouge-Greensboro system, to increase capacity.

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Patent claims rejected by U. S. Supreme Court

A suit for recovery of damages for infringement of patents on a particular type of wall construction, brought to the U. S. Supreme Court from the U. S. Court of Appeals for the Second Circuit, was decided by the Supreme Court in favor of the defendents on April 27. The suit was instituted in New York City by the Milcor Steel Co., holders of a patent issued to one Holdsworth on a combination of metal base and ceiling elements and metal uprights to form the support for metal lath in a partition, in an effort to collect damages from the George A. Fuller Co., the Neff Lathing Co. and the Conver Steel & Wire Co. for infringement of the Holdsworth patent. Damages were denied by the lower courts, and that finding was affirmed by the Supreme Court.

The findings are involved, centering on certain disclaimers filed by the patent holder in the patent office after the suit was begun. The Supreme Court summed them up in the following statement, which includes a quotation from an earlier Supreme Court decision in the case of *Schumacher* v. *Cornell*:

"The Holdsworth patent was for a structure composed of a combination of familiar elements. If there was novelty it consisted in the combination. 'A combination is always an entirety. In such cases, the patentee cannot abandon a part and claim the rest, nor can he be permitted to prove that a part is useless, and, therefore, immaterial. He must stand by his claim as he has made it. If more or less than the whole of his ingredients are used by another, such party . . . has not used the invention or discovery patented. With the change of the elements the identity of the product disappears.' . . . And here . . . the revised claims change the combination set out in the original claims."

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Start Mexico water job

Work intended to relieve the acute water shortage problem of the Mexican Federal District, which includes Mexico City, has been started by the city government. The $2,250,000 job consists of piping water from the Lerma River to the city's distribution facilities.

Press Assn. Photo

Test partly completed Panama highway

A part of more than 100 Army vehicles of all types which participated in a recent test of the new Isthmian Highway across Panama is shown above on the one paved lane of the road thus far completed.

Pushed through dense jungle land as a measure for defense of the canal (ENR, Feb. 12, 1942, p. 235) completion of the road will make possible crossing the isthmus in a matter of a few hours.

Oil lack stops 15 Ohio highway repair contracts

Scarcity of low grade oil for surface treating of secondary highways was given as reason for the cancellation of 15 surface treating projects by the Ohio Department of Highways. The projects cancelled will be re-estimated for use of other bituminous materials and readvertised for bids at a later date, Hal G. Sours, director, said.

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New York topographical bureau head to resign

Charles Underhill Powell, since 1915 chief engineer of the Queens borough (N.Y.C.) Topographical Bureau, has applied for retirement after 43 years of service to the city. A native of Glen Head, L. I., Mr. Powell joined the city soon after graduating from Cornell University in 1898.

As chief of the Topographical Bureau he planned 75,000 acres and 2,500 miles of streets, introduced the "Philadelphia" system of house numbering and street names for the borough, and was in charge of title surveys for acquiring property for streets costing $130,000.

WASHINGTON HIGHLIGHTS

THE steel limitation order was issued this week, as expected (*ENR*, April 30, p. 739). Manufacture of the more than 400 forbidden items, including several of interest to construction, will come to a halt in 90 days. Manufacturers have 15 days in which they may still buy steel, then 45 in which they may process steel on hand, then 30 in which operations are limited to assembly. A special restriction on roofing and siding limits the output of each manufacturer for the remainder of the year to 20 percent of his 1940 production, and limits sales to government agencies; A-L-K or better ratings assigned on PD-3A or P-19 documents; war housing, and maintenance and repair. Manufacturers may file appeals on form PD-37 with the nearest WPB field office.

PRESIDENTIAL signature last week to the nineteen-billion dollar sixth supplemental war appropriation bill brings the total funds appropriated for war construction since June, 1940, to just under $29 billion, or about 18 percent of the $156 billion scheduled for the war program. The construction money consists of $14,365,000 for industrial facilities, $13,184,000,000 for military posts, depots, and stations, $1,392,000,000 for housing. By comparison, appropriations for aircraft total a little over $35 billion, for ordnance, more than $32 billion, naval vessels $15 billion, merchant ships $7.5 billion.

ONLY shortage of construction workers found by the Social Security Board at present is among asbestos workers and pipe fitters. Job openings between now and June for men in these trades are expected to exceed the number of available men now in these trades or having these trades as secondary skills.

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War population growth spurs hospital building

Sudden influxes of workers and their families in the industrial Northeast have necessitated a large amount of hospital and health facility construction.

The Federal Works Agency office in New York last week issued a list of 69 more public works projects immediately concerned with the maintenance and preservation of the public health in Region 1, which includes New England, New York, New Jersey, and Pennsylvania. The Agency said the work was certified as necessary to implement the war effort with community facilities where there have been large population concentrations of war industrial workers, or members of the military forces.

Included in the projects approved were hospitals at Bridgeport, Bristol, Hartford, New Britain, and New London, Conn.; Portland, Bath and Presque Isle, Maine; Weymouth, Winthrop, Quincy, Mass.; Portsmouth, N. H.; Buffalo, Geneva, Dunkirk, Massena, Niagara Falls and Ilion, N. Y.; Corry, Pottstown and Tarentum, Pa.

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Utilities get Bonneville power for emergency

The Bonneville Power Administration last week completed an agreement to interconnect its system temporarily with those of the Washington Water Power and the Pacific Power and Light companies to assist in meeting emergency power demands in the Pacific Northwest.

The new interconnections are in addition to those already made with the public systems of Seattle, Tacoma, Centralia and Grays Harbor, Wash., and Eugene and McMinnville, Ore. While they will not result in making available any additional blocks of power in the region, Administrator Paul J. Raver said the interconnections would further insure stability of service to vital war industries.

Complete war office building in record time

Ordnance Department personnel began to move into the new War Department office building in Arlington County, Va., last week—a full six months before the building was originally scheduled for occupancy.

Although the building is not yet complete, 600,000 sq.ft. of floor space became available on April 30. Following the initial move, other sections of the department will transfer to the new building until the entire space is occupied.

Construction began September 15, 1941.

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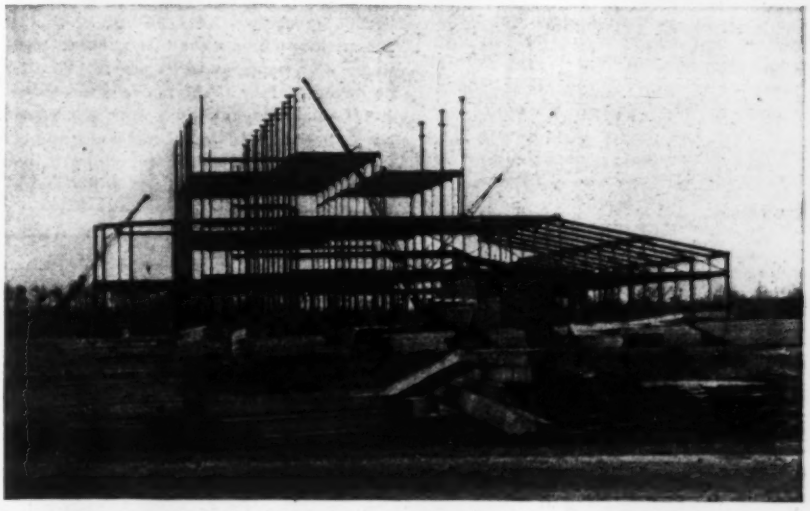
Heck made assistant to Geodetic Survey director

Capt. N. H. Heck, chief of the Division of Terrestrial Magnetism for the U. S. Coast and Geodetic Survey, has been made assistant to the director of the Survey and will devote his attention to scientific and technical matters.

Comdr. O. W. Swainson, who recently has given special attention to sound wave determination, will succeed Capt. Heck, with the title of Chief of the Division of Geomagnetism and Seismology. Comdr. H. A. Cotton will become assistant to Comdr. Swainson.



Steel grandstand project arouses New Jersey ire

Erection of this steel grandstand at a new race track near Camden, N. J., has aroused protest from residents in the heavily industrial area, on the ground that erection of such a building during a national campaign for conservation of metal is detrimental to civilian morale. Meanwhile, work is being pushed on the structure in order to permit a July opening.

Eugene Mori, president of the Garden State Racing Association, builders of the track and grandstand, told local newspapers that all of the materials being used in the structure were ordered before the nation entered the war and therefore were purchased without priority. He was quoted in Newark newspapers as saying that some of the steel is new, but that this material was reclaimed from demolition of a New York elevated railway structure.

The War Production Board is reported to have found no priority violations on the job.

Construction equipment sale and rental placed under strict federal control

All transactions made subject to WPB authorization. OPA issues ceiling on rentals with price on new equipment expected.

Distribution of power shovels, cranes, and all rubber-tired construction equipment was subjected last week to rigid control by the War Production Board. After June 1, no such equipment can be sold except with specific WPB authorization. Until June 1, shipments may still be made on orders carrying an A-1 rating issued prior to May 2.

Hereafter, anyone wishing to place an order for a crane or shovel must submit an application for purchase authorization to WPB on form PD-448 showing why he needs it. Manufacturers must submit their production schedules for approval on form PD-446, and they may not produce until the schedule has been approved.

Effective immediately, rubber tires may not be installed on construction equipment except shovels, cranes, self-propelled graders, carrying and hauling scrapers, and any equipment built for Army, Navy, and Maritime Commission, or lend-lease. After June 1, production of even this equipment must be approved by WPB.

OPA's ceilings

The Office of Price Administration last week put a ceiling over the rental rates which may be charged on construction equipment. The rental ceilings adopted are substantially those recommended in the "Green Book" of the Associated Equipment Distributors. The ceiling governs rentals charged by contractors as well as those charged by dealers, but the former are not much affected since they usually have charged rentals well below those obtained by dealers.

A ceiling governing the price of new construction equipment is expected to be issued within a few days. Meanwhile, equipment prices are of course frozen at March levels.

Reports current during the past month that the Corps of Engineers would adopt the ceiling schedule as a standard rate for rentals of equipment, on fee contracts, from persons other than the contractor have proved unfounded. The corps intends to stick to competitive bidding on third-party rentals. Under the price regulation, of course, no one may bid higher than the ceiling schedule.

The schedules established in the order, Price Regulation No. 134, make no distinction as between geographical areas, as to age of equipment, or in most cases as to make of equipment. Simply, a flat price is established for each size and style of equipment. Rates are established by the day, week, and month. Whichever gives the lowest total rental must be used. For second shift operation, 1½ times the daily rate is to be charged, and for more than two shift twice the day rate. Similar adjustments are provided in the weekly and monthly schedules for multiple-shift operation.

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Rio Grande rectification work nears completion

A $10,736,000 project to canalize and straighten the channel of the Rio Grande above and below El Paso, Tex.—an operation which involved the equal exchange of nearly a square mile of land between Mexico and the United States—is nearing completion.

The river has been shortened between El Paso and Quitman Canyon from 155 miles to 88 miles, and slope of the bed increased from 2 ft. to 3.2 ft. per mile. Rectification works consist primarily of 7 ft. high parallel levees, and a maintained pilot channel in the floodway between the levees, which are 590 ft. apart. The project also includes bridges across the river, grade controls and incidental works.

Canalization is about 90 percent complete, and is designed to provide control of the irrigation waters released from Elephant Butte Reservoir and to guarantee delivery to Mexico of her water quota, established in the treaty of 1906.

The project was built as a flood control and irrigation measure.

Quebec Board takes over all province waterworks

The 1,000 municipal, pub[lic] and private waterwork systems in t[he] Province of Quebec, Canada, supplyi[ng] water to more than 2,000,000 persons, [have been] placed under the jurisdiction [of] the Quebec Public Service Board b[y] virtue of an ordinance issued by the [Board] last week.

Under the ordinance, water [works] will not be allowed to operate [without] a permit from the board; all private waterworks systems are compelled [to] submit annual reports, and to keep [available] plans of their plants and system[s].

Commenting on the order, the board said its control would improve sanitary conditions, offer better protection to the consumer and exercise stricter control over the plants. A number of waterworks, chiefly those located in rural districts, were operated in a haphazard manner, the board's statement said. Filtration plants and other equipment were not always in sanitary condition and service was often discontinued without any given reason.

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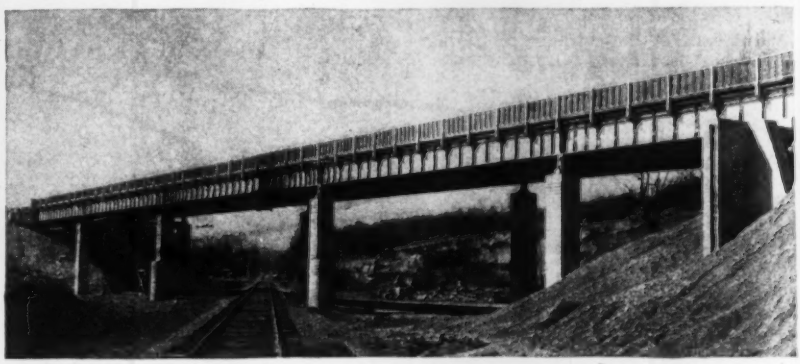
Miller confirmed as Jersey highway chief

Only a few hours before the resignation of his predecessor became effective, Spencer Miller, Jr., of South Orange, was confirmed by the New Jersey state legislature as state highway commissioner. Miller, whose appointment by Governor Edison (*ENR*, March 12, 1942, p. 388) to succeed A. Donald Sterner, aroused a bitter political battle in the state legislative halls, was sworn in for a six-year term immediately after the confirming measure was passed.



Ohio highway bridge built on unusual skew

A new steel-girder-and-concrete-deck bridge over the Baltimore & Ohio R.R. tracks near Strasburg, Ohio, has been built on a 65 deg. skew to accommodate Highway 21.

Built to permit widening at any future time, the 396-ft. long structure will eliminate a dangerous grade crossing. State highway department officials said that Highway 21 carries a daily traffic load of more than 5,000 vehicles in this locality.

John Hill of Mansfield held the $222,553 construction contract.

Jap evacuees to be settled on unused lands of Western irrigation projects

Bureau of Reclamation to supervise work of 20,000 moved from Coast strategic areas. Other war problems add to Bureau's work.

Twenty thousand of the Japanese evacuated recently from the Pacific Coast area to reception centers such as the one in Owens Valley, Cal. (*ENR*, March 26, 1942, p. 460), will soon be moved to two Western irrigation projects where they will be settled under the jurisdiction of the U. S. Bureau of Reclamation. The Bureau will design necessary irrigation works and provide personnel for supervision of the field operations.

The two projects involved are the Minidoka project near Eden, Idaho, and the Klamath project in northern California near the Oregon state line.

In both cases, land undeveloped when the projects were built will be used. At Minidoka the area consists of 17,000 acres under the Milner-Gooding Canal. At Klamath an area of about 12,000 acres in the Sump area of Tule Lake will be reclaimed by the evacuees. Only recently, a diversion tunnel has been completed through which water will be pumped from the swampy Tule Lake area into nearby Lower Klamath Lake.

Other Bureau war problems

The war is producing other problems for the Bureau almost daily. For example, priority ratings for five projects have recently been disapproved by WPB, including three of the small water conservation jobs being done with WPA and CCC labor. The other two are a power plant on the Deschutes project, and the Altus project in Oklahoma for which materials are not available.

Last week, also, the Bureau was instructed to transfer two of the generators and turbines destined for Shasta Dam to Grand Coulee Dam. The heads at the two dams are about the same so that the transfer is practicable although expensive. Two generators are now stored at Boulder Dam, one turbine is at Shasta while the other turbine is nearing completion in the Allis-Chalmers plant at Milwaukee. Power can be produced at Grand Coulee early next spring with these units whereas they could not be in operation at Shasta until a year later. After the war, the units will be returned to Shasta.

In the meantime, the Bureau is planning to take bids for Davis Dam (*ENR*, April 23, 1942, p. 600) May 15. This dam is located on the Colorado River between Boulder and Parker Dams and will provide power for southern California and Arizona. Design studies and field investigations are also under way on Bridge Canyon Dam, above Boulder on the Colorado River, and on Kortes Dam below Seminoe Dam on the North Platte River in Wyoming. Bridge Canyon will be an even more spectacular project than Boulder. It will cost more and its site is in a 4000 ft. deep canyon accessible only by boat from Lake Mead.

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F. F. Rogers dies, former Michigan highway chief

Frank F. Rogers, 83, who was Michigan's state highway commissioner for 16 years, a charter member and former president of the American Association of State Highway Officials, and a former president of the Michigan Engineering Society, died at his home in Lansing April 29.

Entering the service of the state highway department when it was organized in 1905, Mr. Rogers was a deputy to the late Horatio S. Earle until 1913, when he became the state's first elected highway commissioner. He was reelected, usually without opposition, until he resigned January 1, 1929. He continued to serve as consulting engineer until July 1, 1933.

A graduate of Michigan Agricultural College in 1883, Mr. Rogers established a surveying business in Marlette, Mich. In 1891 he was appointed city engineer of Port Huron, and during eight years there he supervised construction of many paving projects, including several built with round cedar blocks on a pine board base.

Fear road machine ruling hits Colorado maintenance

If a recent Public Roads Administration ruling that contractors must have available sufficient equipment to complete any project they bid on remains unchanged, only three Colorado contractors can qualify and these could not complete roads before next winter's shutdown, Charles D. Vail, state highway engineer, said at Denver last week.

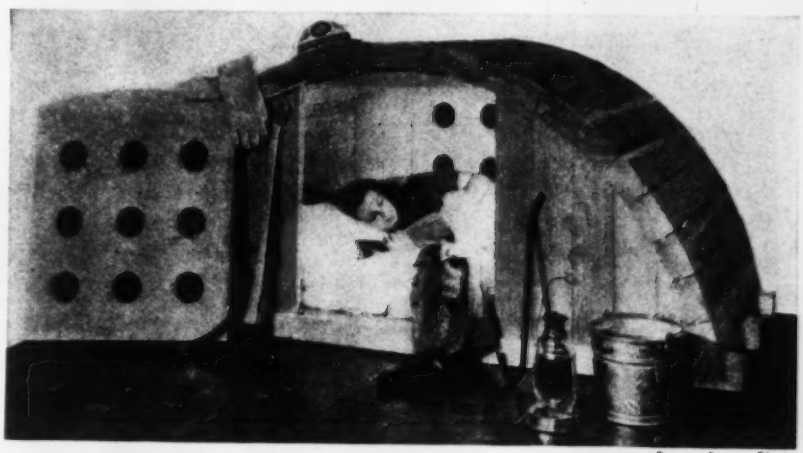
The hopes of the War Production Board that excess maintenance equipment can be diverted to war construction jobs may not materialize fully if the situation in Colorado should be repeated elsewhere.

With a large mileage of roads requiring constant snow removal throughout a long season, and with only a short season in which to make necessary repairs, Colorado lacks sufficient maintenance machines and under existing WPB rulings can purchase no more.

Part of the fault for this condition lies in the economy program instituted by Governor Carr in 1939, when he reduced annual equipment purchases from about $400,000 to $100,000. During the past two years, purchases were stepped up to about $300,000, and $350,000 was scheduled for 1942. To date, however, only $108,000 has been spent, and no more purchases are in sight.

Mr. Vail said the state is in difficulty even in respect to equipment for constructing access roads to military establishments. With 178 miles of such roads to build, only 40 miles has been let due to the PRA ruling.

Under existing circumstances, and considering the bid price on the mileage now let, the cost of access road programs is likely to exceed the funds available for the work, it was indicated.



Press Assn. Photo

Timber raid shelter answers priority squeeze

One answer to the demands of industry and the armed services for metals is this timber air raid shelter. Constructed entirely of fitted wood, no nails or glue are used in construction. The shelter has been tested to withstand 10 tons of debris. It has room for a standard double bed mattress with extra space at both ends, and is equipped with ventilator holes.

Rail salvage made Kentucky WPA project

The Kentucky WPA office last week approved a project to remove about 350 tons of abandoned street car rails from the streets of Frankfort, for use in war production. The city, as sponsor, will pay $7,014 of the cost and the WPA the remainder, $16,721.

Meanwhile, a device to reclaim abandoned street car rails embedded in city streets was demonstrated recently at Asheville, N. C., before state salvage and WPA officials.

Invented and perfected by Norman S. Hildebran, of Asheville, the device anchors the pavement on each side of the rails and rips up the rails themselves by means of a cable-winch-tractor combination, leaving a surface break of only 11 in. Gaps left in the pavement could be repaired by means of WPA projects, it has been proposed.

Canada halts removal of street car rails

A recent bill passed by the Canadian legislature at Ottawa forbids the removal of street car tracks from streets anywhere in the Dominion for the duration of the war.

Government officials explain that the order was made necessary by increasing restrictions in the use of gasoline and rubber which may require resumption of many electric car transit systems recently abandoned in favor of buses.

BRIEF NEWS

THE Pennsylvania Turnpike earned a monthly average of $208,644 from October 1, 1941, until April 1, 1942. Total receipts were $83,130 below the amount necessary to cover all fixed charges, but monthly average earnings were $23,725 above the average for the first six months of the toll road's operation.

DAVID H. DIEHL, executive director of the Pennsylvania General State Authority, has announced that recent restrictions on new construction work will not affect the $13,000,000 building program of his agency. The Authority at present is engaged chiefly in construction and maintenance of buildings for the Commonwealth—most of them being institutions.

SEEKING to halt wind erosion of a 5½ mile causeway across Lake Muttamuskeet, N. C., the North Carolina Highway and Public Works Commission has begun planting rows of lespedeza hay along the side of the roadway.

THE Tennessee Valley Authority has completed the planting of about 400,000 trees to protect several highways and road fills from wave action in the Marshall, Calloway and Henry county areas of the Kentucky reservoir, in Tennessee.

THE CORPS OF ENGINEERS has established a Corps area procurement office at Portland, Ore., with Frank J. Collins, commodity buyer, in charge.

Iowa liberalizes truck loading regulations

In a move to increase the flow of war materials through the state, and forestall the possibility of gasoline rationing, Governor George A. Wilson of Iowa last week ordered liberalization of state truck-loading limit regulations.

The order provides: A maximum load of 18,000 lb. per axle for all trucks; a gross load maximum of 28,000 lb. plus 700 additional lb. for each foot between the front and rear axles; a maximum load on any one wheel, when loaded, of 9,000 lb. The new order raises limits as much as a ton in some categories. Additionally, it increases the maximum allowable truck length from 33 to 35 ft. and the height from 12 to 12½ ft.

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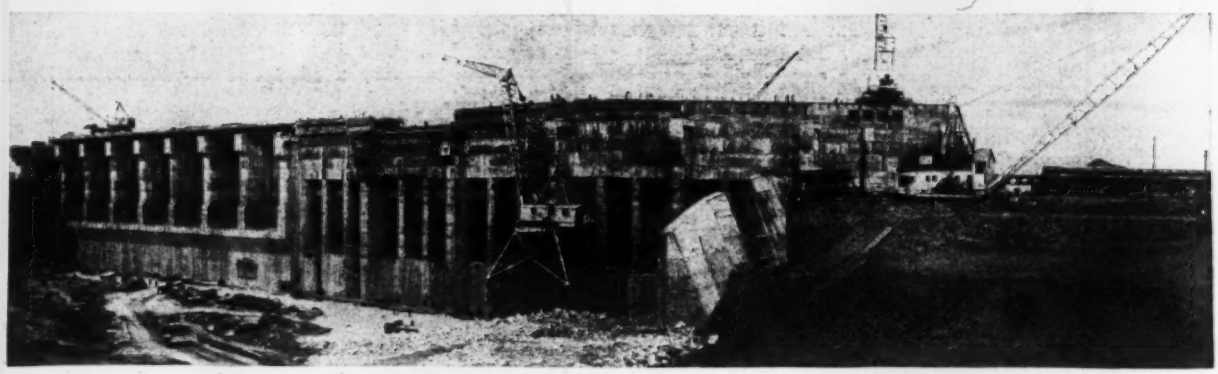
County's truck weight limit ruled not valid

A special ordinance of Indian River County, Fla., that places a load limit on trucks far below that permitted by the state, was declared invalid by the Florida State Supreme Court recently.

The county provided a maximum weight of 5 tons for a single vehicle crossing bridges over the Indian River, although the state law allows vehicle combination weights up to 20 tons.

The court pointed out that the bridges in question are part of the state highway system, and special county regulations cannot restrict the weights authorized by general state law.



Lock, powerhouse and third of spillway finished at TVA's Kentucky Dam

Kentucky Dam, near the mouth of the Tennessee River and largest single construction project of the Tennessee Valley Authority, is rapidly taking shape. The matched photographs above show the upstream face of the five-unit powerhouse and 9½ bays of the spillway.

Enclosed within one of the largest cofferdams ever built (ENR, Jan. 1 and Jan. 29, 1942, pp. 30 and 194), the structures shown rise about 150 ft. above bedrock and contain more than 350,000 cu.yd. of concrete. In construction, concrete was transported from a central mixing plant about 1,820 ft. by belt conveyor and handled to the forms in 4-cu.yd. buckets by two revolving cranes mounted on gantries 66 ft. high.

With work in this area almost complete and a navigation lock with a maximum lift of 73 ft. previously completed, work now centers on building the second and final cellular sheet pile cofferdam in which the remaining 14½ bays of the spillway will be constructed.

The dam is being built by the TVA with its own forces, headed by T. B. Parker, chief engineer, and A. L. Pauls, chief construction engineer. George P. Jessup is project manager, H. L. Broadfoot is construction engineer, and B. S. Philbrick is construction superintendent.

OBITUARY

George E. Wells, 66, founder of a St. Louis, Mo., consulting engineering firm bearing his name, died April 22 at St. Louis.

Charles Meads, 72, president of Charles Mead & Co., of New York, died April 24 in Brooklyn, N. Y. Mr. Meads also headed the Meads Engineering Co., and directed many municipal projects, including the first contract for the Brooklyn Public Library building, and many of the stations on the Independent Subway system.

H. Edward Dunkle, for many years consulting engineer of the Royal Dutch Oil Co., of New York, died recently at Richmond, Va.

Willliam H. Cramer, 54, assistant Jasper County (Iowa) engineer for the past 23 years, died recently at his home.

Surry Parker, 75, a former highway commissioner of Beaufort County (N. C.) and a pioneer in railroad construction, died April 28 at Norfolk, Va.

Ralph E. Rohn, 54, a civil engineer for the H. K. Ferguson Co., of Cleveland, died April 29 at Canton, Ohio.

William James Caldwell, of Dumas, Ark., for the past 35 years county surveyor, died in a Dumas hospital April 26. He was 88.

James R. Valentine, 50, an inspector for the Corps of Engineers, died April 27 at his home in Queens, N. Y.

Andrew Bird Wade, 71, head of the firm of A. D. Wade & Son, contractors of Miami, Fla., died at Miami recently.

Leonard E. Schlemm, 65, landscape-engineer and town planning expert, died at his home in Quebec April 29.

Daniel T. Anglin, 82, retired superintendent of construction for the Long Island Railroad, died May 2 at Elmsford, N. Y.

Albert V. Franke, 89, who was a civil engineer practicing in Cuba until his retirement 40 years ago, died April 27 at Mount Vernon, N. Y.

Frank Louis Mason, 70, a contractor of Blue Hill, Maine, died April 30 at Auburndale, Fla.

John W. Smith, 67, WPA supervisor of Burke County (N. C.) and former North Carolina and Virginia contractor, died at Morganton, N. C., April 27.

Byron A. Bent, 84, formerly superintendent of Rhodes, Curry Ltd., contractors of Amherst, N. S., died April 21 at Middleton, N. S.

CONTRACTS AND CAPITAL

Construction total hits all-time peak

(*Continued from p. 53*)

and roads topped their totals of a year ago. Subtotals for the week in each class of construction are: waterworks, $1,783,000; sewerage, $5,633,000; bridges, $1,209,000; industrial buildings, $4,384,000; commercial building and large-scale private housing, $12,068,000; public buildings, $290,275,000; earthwork and drainage, $2,276,000; streets and roads, $17,818,000; and unclassified construction, $99,509,000.

The inclusion of $4,314,000,000 in federal appropriations for construction in this week's new financing volume brought the total to $4,319,031,000, the highest weekly financing figure ever reported. This compared with $157,025,000 for the corresponding 1941 week. Besides the federal funds, the total included $4,031,000 in state and municipal bond sales, and $1,000,000 in corporate security issues.

New construction financing for the year to date, $6,777,852,000, exceeded the $3,216,568,000 reported for the corresponding 19-week period last year by 111 percent.

CONTRACTS

(Thousands of dollars)

	Week Ending May 8 1941	Apr. 30 1942	May 7 1942
Federal	$24,391	$162,648	$396,120
State & Municipal	24,577	11,318	21,644
Total public	$48,968	$173,966	$417,764
Total private	23,273	8,304	17,191
TOTALS	$72,241	$182,270	$434,955
Cumulative 1942 (19 weeks)			$3,326,739
1941 (19 weeks)			$2,034,477

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1941 19 weeks	1942 19 weeks
NON-FEDERAL	$347,731	$238,897
Corp. Securities	108,962	76,414
State & Mun.	198,705	131,120
U.S.H.A. loans	13,521	
R.F.C. loans	26,543	31,363
FEDERAL	$2,868,837	$6,538,955
TOTAL CAPITAL	$3,216,568	$6,777,852

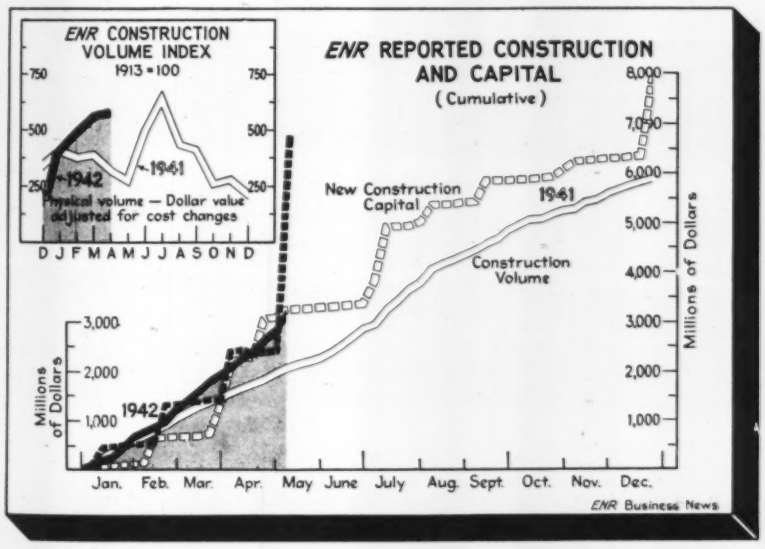
ENR INDEX NUMBERS

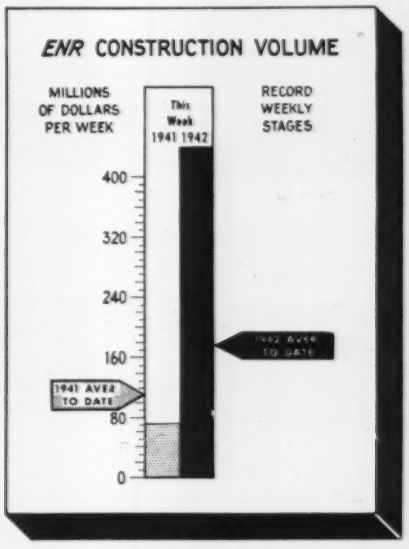
Index Base = 100		1913	1926
Construction Cost	May '42	272.30	130.89
Building Cost	May '42	220.14	119.00
Volume	Apr. '42	569	249

FHA MORTGAGES

	Week Ending May 3 1941	Apr. 25 1942	May 2 1942
Selected for appraisal			
Title II	$33,696	$23,086	$17,740*
Title VI	$ 6,909	$12,553	$11,211*

* Subject to revision.





Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

WPB Equipment Survey

Sir: Your editorial, "Enough Construction Equipment?" (*ENR*, April 23, p. 604) was brought to our attention. That we agree with most of it seems unnecessary to say, but if you had made contact with the Bureau of Governmental Requirements of which Maury Maverick is chief you would have discovered what that bureau is doing with regard to making a survey of road equipment both governmentally owned and privately owned. To go into detail of the work of this bureau would take time and space and would not bear directly on our subject. To know this bureau's work relative to road construction equipment, we believe, would have enlightened you.

The Bureau of Governmental Requirements originally was formed to protect and further the interests, under the priority regulations, of all subdivisions of government—states, counties, cities and towns. Under the leadership and guidance of Maury Maverick, this bureau is doing its job 100 percent. This we hope to prove in relation to your editorial.

The bureau is divided into sections to take care of all possible wants of government requirements, such as public buildings, schools, water supply, home protection, prison industries, fire protection, highway maintenance and construction, etc. The highway and maintenance section always has been under the same supervision since its formation. This section must pass on all applications for priority rating that governmental agencies must have before they can purchase any highway or construction equipment. To enable us to pass intelligently on these applications, we have requested the applicants to submit a list of their road equipment, its condition and the mileage of roads they are maintaining. So you see, that we really began a survey of road equipment as far back as last October. We did this, knowing the amount of critical material being involved in the manufacture of this class of equipment and it was our purpose to conserve the material but, at the same time, not to penalize those agencies that really needed new machines.

When the demands of the federal lend-lease plan for road construction equipment began to be felt, it was easily seen that less equipment would be available. Therefore, we made more demands on the equipment now owned by the various agencies. After the Pearl Harbor incident, when the Army and Navy began to put in their demands for this equipment, there was a very small percentage available for our distribution. It then became obvious that something drastic would have to be done to give help to those governmental agencies that really were in need of additional road-building equipment.

From the study of equipment lists submitted, as stated above, it was seen that many governmental agencies had more equipment than was really necessary, in this emergency, while others had barely enough. With this in mind, we sent out a questionnaire to all subdivisions of government, requesting their entire list of road construction equipment, the date of purchase, its condition, their contemplated purchases for the year 1942 and the mileage of roads they are maintaining. This was the first step, to our knowledge, taken by anyone to make such a survey.

Questionnaires went to 2,000 towns and cities under 10,000 population, to 1,200 cities over 10,000 population, to 3,044 counties, and to the forty-eight state highway departments. We, therefore, believe that we have covered governmental agencies in a very thorough manner. When our survey is finished, we are confident that we will have the lists of all the state highway departments, as well as the counties and a large percentage of all the important towns and cities.

The system we are using in classifying and listing this equipment by states is something of which we are proud. At this writing, we estimate that we have received 50 percent of returns and that the heads of the various departments are beginning to realize the importance of this survey to them, as well as to our government's war effort. We believe [illegible] returns will come in speedier [illegible] they have in the past.

At the request of various fed[illegible] agencies, we have started the s[illegible] survey of privately owned equipm[illegible] by sending the same questionnair[illegible] dealers. While this questionnaire [illegible] only been out a few days, retu[illegible] are already coming in. It is our h[illegible] that the remaining agencies that p[illegible] vately own this equipment will al[illegible] be surveyed.

To dwell on the importance of t[illegible] work of ours would only be repeating your worthy editorial.

We wish to take this opportunity to thank the American Road Builders Association, county highway officials division and the municipal division, as well as the Associated Equipment Distributors, for their helpful cooperation.

We trust that we have proven that the Bureau of Governmental Requirements of the War Production Board is on the job and that we are working with one aim, and that is Mr. Maverick's slogan for his bureau, "For Victory!"

LOUIS LEVENSON
Head of Construction Machinery Section
Bureau of Governmental Requirements
War Production Board
Washington

[See editorial statement on page 767 of this issue.—EDITORS.]

Water Valve Operation Under Emergency Conditions

Sir: In your editorial "Water Service—How Important?" (Apr. 9, p. 535), you refer to unqualified parties handling water valves during air raids. You state, "The folly of having anyone but a qualified waterworks man undertake such operations is too apparent for comment."

I would suggest that an intermediate course is possible and might with advantage be used across the country. In this small community of 10,000 people we have close to 400 valves. In the ordinary way, only two men are completely familiar with the location and operation of these valves. As we are in the most vulnerable coast point of Canada it is possible that we may have an air attack that might burst mains in a number of points simultaneously, and also that our two experts might be knocked out.

Visualizing this situation, I had our 400 valves cleaned off and the covers painted bright yellow; then maps were compiled splitting our municipality into 16 areas. Two intelligent residents were chosen from each area and specially trained as water-wardens, and they were supplied with individual maps of their areas clearly showing each valve and the distance of the main out from property lines. Each valve was given a distinguishing number, and lists were compiled tabulating every block and listing the valves by number which had to be cut off for each individual block in a street.

These "water-wardens" were enrolled under Engineering A.R.P. Services, and their *sole* duty is to be familiar with the location and operation of these valves. Our regular employees who handle these valves gave manual instruction on the ground to these wardens; they were trained how to close valves gently, how to identify cocks from valves, how to listen for hissing noises to confirm whether valves were on or off, and how to identify a serious main burst from a simple house connection burst, and many other points.

I maintain that with this intermediate semi-efficient crew we have much more adequately protected our water supply, for fire fighting, etc. Recently a federal Canadian A.R.P. representative visited us, and was surprised at this organization, and informed me that it was the only one of its kind across Canada. A too-rigid policy of excluding all but experts from handling valves may be one of the ultra-conservative things we have to forget in a war emergency.

A. S. G. MUSGRAVE
Municipal Engineer
Oak Bay, British Columbia, Canada

Professional Unity Needed

Sir: No wiser words were ever spoken than those written into your editorial "Mobilize Engineers" in the April 9th issue of your exceedingly interesting journal. Your message to engineers, and more especially to engineering societies, appealed to me quite strongly, perhaps because I had just put the finishing touches on an article along the same lines.

America needs now as never before complete integration of engineers—employers and employees alike—to make both the *judgment* and *services* of all engineers available to government and industry.

A strong national, all-inclusive association of engineers would be the best possible "executive committee" for business and industry to work out the kind of coordination that is vital to the winning of the war and to the survival of free enterprise.

The potentialities are all the more apparent if we consider the negative aspects of the situation. Think of the service that engineers have failed, as a profession, to give in two great crises—the depression and the war—because there was no single, powerful all-embracing association of engineers to guide Congress and the administrative agencies of government in "pump priming," in formulating the vast public works program by which unemployment was relieved and normal consumption revived! Such an organization, such mobilization of engineering ability and influence, would have been able to interpret the aims of the government to industry; to dispose engineering manpower quickly and efficiently; to anticipate needs and insure an adequate supply of all defense materials; to mobilize industrial plants and manpower.

This war which has been forced upon the free people of the earth by the totalitarian states is in reality production with destructive, rather than constructive, aims, in which engineers are servile instruments of "managers." Yet engineering is nowhere so integrated as to be able to prevent such prostitution of its engineering knowledge and skill.

Our engineers today are missing the most glorious positive opportunity to perform a tremendous patriotic service. Brilliant engineers are serving in industry and in government—but as individuals. Because there was no powerful association of engineers in all branches of business and industry, ready to collaborate on the capacity of the steel industry, Gano Dunn carried the ball without a player to run interference for him. William L. Batt and Lt. Gen. William Knudsen pinch hit for the powerful engineering society that does not exist. Vannevar Bush marshals the inventive and scientific personnel of the nation. Isn't it apparent that there should be ever ready for such emergencies a national, authoritative engineering association including every kind and grade of engineer, to make available to the nation all the resources of the profession?

American Engineering Council, with its restricted powers, and with its limited resources, was the only agency ever set up by the profession which might, by any stretch of one's imagination, be considered, even in the remotest way, a step in that direction. Unfortunately, it went out of existence at the beginning of this emergency period.

The impotency of engineers is not alone the engineers' hard luck; it is society's misfortune as well.

M. E. MCIVER
Secretary,
American Association of Engineers
Chicago, Ill.

[We appreciate Miss McIver's complimentary words but feel called upon to come to the defense of the engineering organizations that she indicts for having failed in their obligation to the nation during the late depression. Notable work was done by the American Society of Civil Engineers and the American Water Works Association, to name the two most outstanding. Even American Engineering Council had a part in that work, but its effectiveness was weakened by its cosmopolitan character—for which Miss McIver pleads. Such diverse economic views were represented on its board as to make it ineffectual, which without doubt would be the case with the all-inclusive organization that Miss McIver proposes.—EDITORS.]

27th Engineers, U. S. Army

Sir: Having been a subscriber to your publication for a great many years, I am taking the liberty of writing you to obtain some information which I thought you might perhaps be able to furnish.

I was a member of the 27th Engineers, 1st Army Corps, in the First World War, and I would appreciate it very much your directing this letter to someone who might be able to furnish me with any information or details regarding the Association of the 27th Engineers.

CLYDE BREWSTER
308 N. Park Ave.,
Herrin, Ill.

[Not knowing the address of the association, this letter is published in the hope that it will come to the attention of one who does.—EDITORS.]

EDITORIALS

VOLUME 128 NUMBER 19

May 7, 1942

Stimulated By Necessity

LAMINATED, GLUED ARCHES OF WOOD used for hangar construction at one of our air fields had the virtue of saving steel for other war needs, but introduced a new problem in door design and operation. Adequate for roof loads, the wood trusses could not be designed economically to carry the additional load of heavy hangar doors. This led to the development of a collapsible door that would disappear in a shallow trench below the floor when opened. Described in this issue, the door is entirely independent of the building frame and yet permits opening the entire end of the hangar in a matter of seconds. This development is a prime illustration of how necessity is stimulating departures from standard practice and thereby introducing important improvements.

Civilian Risks

PROPER PERSPECTIVE is needed in determining the extent to which plans for civil protection are to be put into effect. This need was emphasized by Samuel A. Greeley at the spring meeting of the American Society of Civil Engineers in calling for establishment of a national policy with respect to putting plans for protection of sanitary services into effect (*ENR* April 30, p. 743). As Mr. Greeley pointed out, existing stock of pipe and valves and the multitude of other items needed for proposed duplications of water-supply lines are inadequate to meet anything like the quantities called for in plans that have been made from coast to coast, and if the government were to authorize the diversion of critical materials to the manufacture of such supplies the diversion would seriously interfere with the nation's war effort. Mr. Greeley suggested that the federal government fix zones of high risk in which at least some part of the plans should be put into effect and where the building up of stocks of materials and equipment to repair bomb damage would be permitted. Other areas would have to wait until experience has shown the original conclusions as to points of probable attack to be in error. The same approach must be taken to such matters as construction of air-raid shelte[rs]. Defense will not win the war. Our whole effort m[ust] be concentrated on building up our forces of [ag]gression. In attaining that end the civilian must [ta]ke risks along with the men on active service.

Oil for War Roads

LIMITATIONS on oil and asphalt products [fo]r repair of roads and streets is not compatible [wi]th continued flow of motor fuel for pleasure driving. While the road-oil restriction hits fewer p[eo]ple immediately, and therefore will not be criticized so loudly, it is likely to prove serious in a few months. Restricting new construction to direct war needs is essential and proper, but it is far more essential that asphalt products for repair of highways, streets and farm roads be allotted than to continue to supply gasoline to Sunday drivers. If we expect to maintain our present hauling of goods to market and preserve our roads for the real necessities of civilian life it is essential that roads be maintained in a condition causing the least wear on tires and the least depreciation on hauling equipment. The adage that "a stitch in time saves nine" is most applicable to the maintenance of roads. Oil and asphalt for their maintenance should not be curtailed simply to provide tank-car space for less essential uses.

Savings Through Balanced Design

IN TIMES OF MATERIALS SHORTAGE, such as this, the temptation is strong to shave factors of safety by using higher unit stresses and thus to reduce the amount of material required. One warning that has been advanced against the use of higher unit stresses is that some parts of a structure might be dangerously weakened thereby. This is merely a recognition of the well known fact that designing according to a fixed unit stress does not produce the same factor of safety in all members, i.e. the design is unbalanced, and some members are unnecessarily strong. An interesting design method for reinforced concrete is suggested in this issue by A. J. Boase, which would not only assure a more balanced design but would permit substantial savings in reinforcing steel. It involves simply the use for design purposes of a less-than-actual dead load (a 0.7 dead load is suggested), and requires no change in conventional design procedures nor in code unit stresses. In effect it permits automatic use of higher unit stresses, the amount of increase depending upon the dead-to-live-load ratio of each member: high ratio, high stresses. In effect, also, the method reduces the dead load factor of safety while maintaining the same safety factor for live

load. Justification for such increased stresses and reduced safety factors is based on the excess, non-usable, carrying capacity of conventionally designed heavy-dead-load members and upon the fact that values of dead loads are fixed and calculable. Using a reduced dead load for design, of course, reduces bending moments and consequently the amount of reinforcing steel required. Designers should find Mr. Boase's article both stimulating and thought-provoking.

Construction Equipment Needs

IN A LETTER reproduced on the pages just preceding, Louis Levenson, head of the Construction Machinery Section of the War Production Board, questions the need for the census of all *construction* equipment urged by *Engineering News-Record* in an editorial entitled "Enough Construction Equipment?", published in the April 23 issue. Mr. Levenson calls attention to the survey of *road-building* equipment begun by his section some months ago, implying that this survey makes unnecessary the complete census called for by us.

In raising question as to how much capacity to produce construction equipment must be maintained during the war period, the editors of this journal did not intend to depreciate the value of the survey to which Mr. Levenson refers. Our purpose was to stimulate thinking on the War Production Board's difficult problem of maintaining a flow of new construction equipment adequate for wartime needs while at the same time obtaining maximum war use of the resources of men and machines at the command of the manufacturers of construction equipment; also, to develop a responsive attitude toward a census of construction equipment that to us appears essential in obtaining a correct answer to the board's problem. The survey of roadbuilding equipment to which Mr. Levenson refers served a useful purpose, but it now is out-of-date as it was inaugurated long before the nation's war program had been expanded to its present proportions, and before state highway engineers had had an opportunity to estimate what effect curtailment of rubber and fuel supplies would have on their maintenance requirements. And we submit further that a voluntary survey that to date has produced only 50 percent returns is of little value in answering the question that now faces the War Production Board.

What is needed, as we pointed out in our editorial, is a survey of *all types* of construction equipment, made on a national basis with all the speed and with the compulsory requirements of the surveys of man-power that are being conducted under the Selective Service Act. The War Production Board has the power to make such a census, and its Construction Machinery Section has the technical skill required for a quick analysis of findings of the census. Until we know how much construction equipment we have, what its service life is and whether it is engaged on, or needed for, war work or essential maintenance, there is no basis for an intelligent estimate of how much of the construction-machinery industry can be safely converted to production of war materials.

Traffic in Blackouts

THE NEED FOR maintenance of adequate street and highway lighting right up to the time a blackout is made necessary by the close approach of hostile airplanes is stressed by George A. Eddy in an article on the blacking out of street lights on page 791 of this issue. Experience in England has shown that the accident rate rises so sharply during a blackout as to make it appear probable that in this country fatalities due to auto accidents might be more serious than those due to bombing. Another serious aspect is the delays to trucks serving war industries caused by long blackouts in industrial areas. Anything approaching a complete blackout of street lights, signal lamps and auto headlights slows down traffic to a crawling pace.

This latter aspect, as it relates to the "dimout" now in effect along much of our seacoast, calls for special attention by street and highway authorities so that essential traffic will not be delayed by needlessly restrictive reduction in traffic lights. There can be no question but that all lighting that contributes to the glow that has aided submarines at night must be eliminated, but there is good reason to believe that by proper shading or painting of light globes, light can be concentrated on pavements in the coast areas in sufficient intensity to make traffic reasonably safe without throwing any appreciable amount of light on the sky. Study may also show that traffic should be diverted from certain sections of coast highways at night, or that these roads can be used with safety if headlights are dimmed on some curves or grades. Here is a field for fruitful study before the return of long nights.

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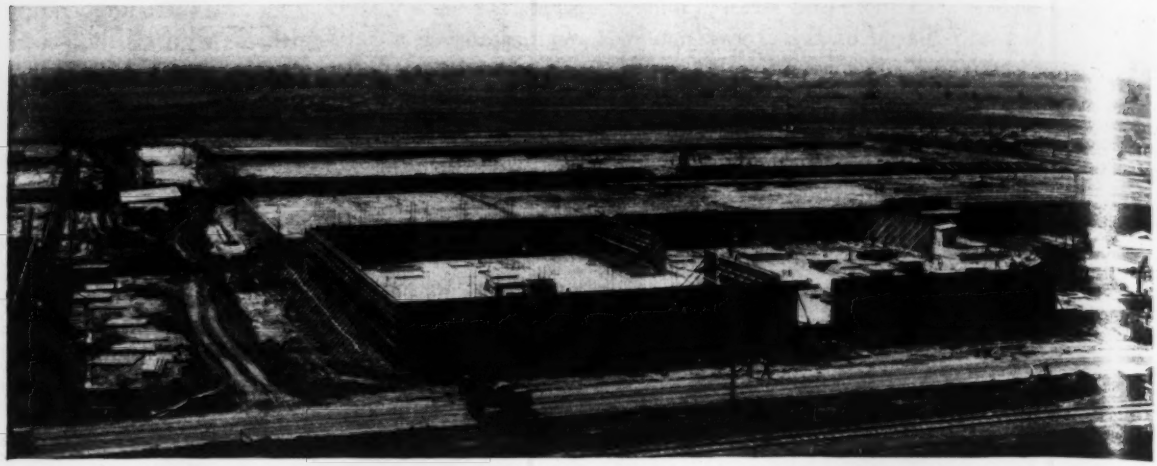


Fig. 1. The service road in the foreground was paved with concrete as one of the early construction operations.

Substantial Service Roads Speed Army Base Construction

***Contents in Brief**—Work on warehouses for a Quartermaster base expedited by adequate provisions for mobility of the construction equipment. Early construction of the warehouse floors provides working areas for form construction and for framing timber roof trusses. Form lumber and roof trusses framed in a central carpenter shop and assembled on the warehouse floor. Wall concrete placed with traveling tower mixers operating inside the warehouses.*

EARLY CONSTRUCTION of the concrete roads that ultimately will serve the large warehouses of one of the new Quartermaster depots of the army, and provision of temporary wooden surfacing units to keep construction equipment from being mired and slowed down by the heavy clay of the site, greatly reduced delays on the depot during winter months, and assures completion of the current work within the specified time and below the estimated cost. Another factor that minimized delays was a decision to construct the concrete floors of the warehouses in advance of wall construction, thus giving large open floors on which forms could be constructed and roof trusses assembled.

The principal units of the depot are warehouses 180x602 ft. in plan, set in four parallel rows, with three railroad tracks between each two rows of warehouses, and with service drives on the sides opposite to the rail platforms and at the ends of the warehouses. There also is a concrete drive between the track serving the warehouse platform, and the track area is to be surfaced to top of rail with bituminous concrete to facilitate its use by trucks when necessary. Concrete platforms 15 ft. wide run the full length of each warehouse along its track frontage.

The warehouses have concrete walls and floors, and timber roofs carried on timber trusses which in turn are supported on the walls and on cylindrical concrete columns. Concrete fire walls divide each warehouse into five sections, 120x180 ft. Each of these sections is surmounted by a large roof monitor, occupying about one-third of the roof area, to provide light and ventilation. The roofs are flat, surfaced with built-up felt and asphalt roofing.

Ventilator fans in the monitors provide forced ventilation where that is required. Some units are equipped with steam heaters.

The only openings in the exterior walls are large doors on the rail platforms at one side of the building, at the central truck-loading bay on the other side, and large doors in the ends, served by ramps, which permit trucks to be driven directly into the warehouses. Otherwise the walls are solid except for ventilator openings at floor level in the sides opposite the platform doors. There are two large interior doors through each fire wall. All doors are of the overhead roller type, those through the fire walls being equipped with automatic closing devices. The ventilator openings have fixed steel louvres, and each is equipped with a steel plate shutter held in the open position by a fusible link.

Construction operations

For construction operations, the warehouses were divided into groups, four parallel buildings being put under a separate superintendent. Thus, construction of each warehouse in the first row started simultaneously with independent crews, and as each construction step was completed the crew moved across to the corresponding warehouse in the next row. Four such units in various stages of construction are shown in Fig. 1. This arrangement of operations called for the use of all concrete forms four

times, and made possible a plan whereby a form from any section of wall, as the walls were stripped, could be moved directly across to the next warehouse and stacked in proper order for use in that warehouse, each form having to move only the distance center to center of warehouses to its position in the next warehouse.

Timber framing shop

All major cutting of form lumber and all framing of timber for the roof trusses was done in a central carpenter shop. By the end of the current operations that shop will have handled 23,000,000 fbm. of lumber.

Concrete aggregates and transit-mixed concrete are supplied from a central plant under a subcontract which includes both truck delivery of dry batches to pavers or tower mixers, or delivery of transit-mixed concrete.

An ingenious element of the aggregate plant is the arrangement for cement deliveries to batch trucks or to transit mixers. At doors along the outgoing side of the cement house, electrically operated hoppers suspended from an overhead trolley track are so arranged that they can be lowered into a pit below floor level while the required number of bags of cement are dumped in, then they are hoisted from the pit and run out over the batch truck, or transit mixer, where the cement is dumped through a bottom spout.

Site grading

The site is fairly level, requiring no deep cutting, but due to the very wide graded area required for the warehouses and rail classification yard, the total amount of earth moved reached a large figure. General leveling of the warehouse area was done first and then cuts were made for the tracks and roadway, as shown in Fig. 2. The soil is a heavy clay which works into a deep mud when wet. Because of this, it was decided to build the permanent concrete drives as one of the early operations, also to floor the warehouses in advance of wall construction. For surfacing of temporary roads used by cranes, mixers and aggregate trucks, a large number of timber mats were built which could be thrown down in advance of the equipment as it moved along.

After the cuts had been made for the roads and tracks, wall and column footings were laid, and the grade beams were built up to floor level. At a few points treated timber piles were driven to insure adequate bearing for the columns, but over most of the area the soil had ample bearing value. By the time the grade beams for the first row of buildings had been completed, paving of the first service road had been completed and was ready for use.

Finish grading of the floor area was done by hand, all filling being tamped by hand in thin layers.

Floors are of 6-in. concrete, reinforced with wire mesh to control cracking. There are expansion joints along the outer walls, at the fire walls and throughout the floor area in 30x40-ft. sections. Concrete for the floor was delivered in transit mixers or was mixed on the job in pavers or in the tower mixers that had been purchased for wall construction. These mixers and the batch trucks traveled over the graded floor area on timber mats for the initial pours and then on the floors themselves for the final run. Spreading and finishing was done by hand.

Wall construction methods

Truck-mounted mixers equipped with towers and counterweighted chutes were selected for placing concrete in the walls in preference to the more conventional method of delivering concrete in buggies operating on runways to a central supply point because of greater flexibility and large savings in scaffolding. The walls are 10 in. thick and 24 ft. high above floor level. They are reinforced for temperature only.

Tower mixers used

A low tower is used on the mixer that places concrete in the lower parts of the walls, and a high tower (55 ft.) is used for the upper sections. Forms for the outside of the walls and for one side of the fire walls are made in two panels, 13 ft. and 11 ft. high, respectively; on the working side, to facilitate placing concrete, three 8-ft. high panels are employed. Concrete is placed in 8-ft. lifts, a 4-ft. depth being placed on the first run in any section of wall and the remaining 4 ft. on the return run. This gives time for initial set to take place in the lower concrete, thereby materially reducing the bursting pressure on the forms. Workmen doing the tamping and operating the vibrators work from platforms carried on brackets bolted to the forms.

The method of form bracing is shown in Fig. 3. When not supported on the rail platforms, as shown in Fig. 3, mud sills to which the outside braces are bolted are staked to the ground. Inside the building the mud sills are secured to the floor by lag screws set in spiral pockets that were cast in the concrete floor as it was placed.

Form ties are of the type in which the forms are secured in correct position by wedges on the ends of a small specially formed rod running directly through the forms. When the ends

Fig. 2. Areas to be occupied by the first warehouses were leveled off to the elevation of the base of the floor slabs and then depressions for tracks and service roads were cut down to subgrade, using the excavated material for filling for future warehouses.

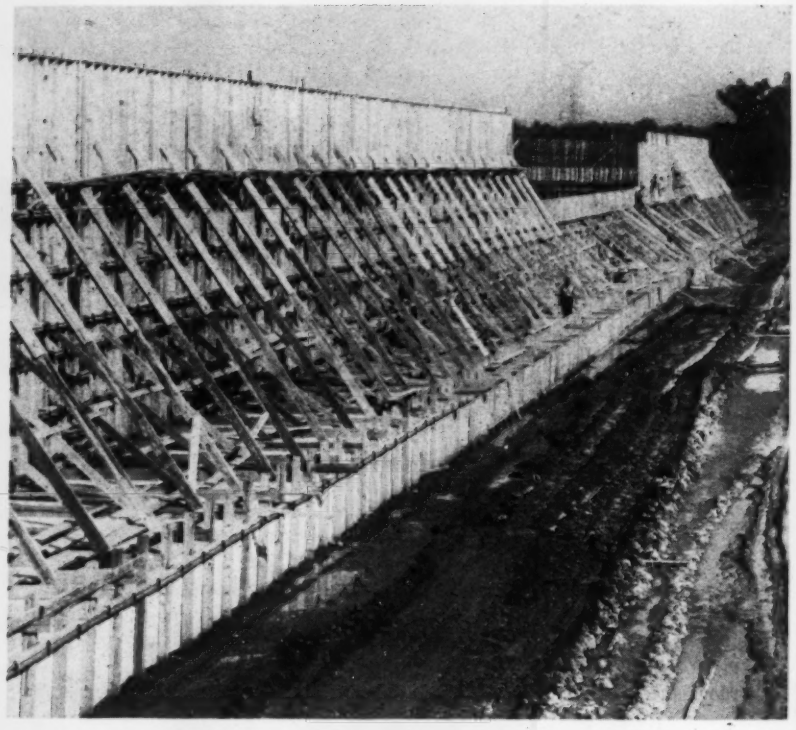


Fig. 3. Exterior wall forms are set in two lifts for the full 24-ft. height as all concrete is placed from inside the warehouse. Mud sills for the forms here shown are set on a railroad platform.

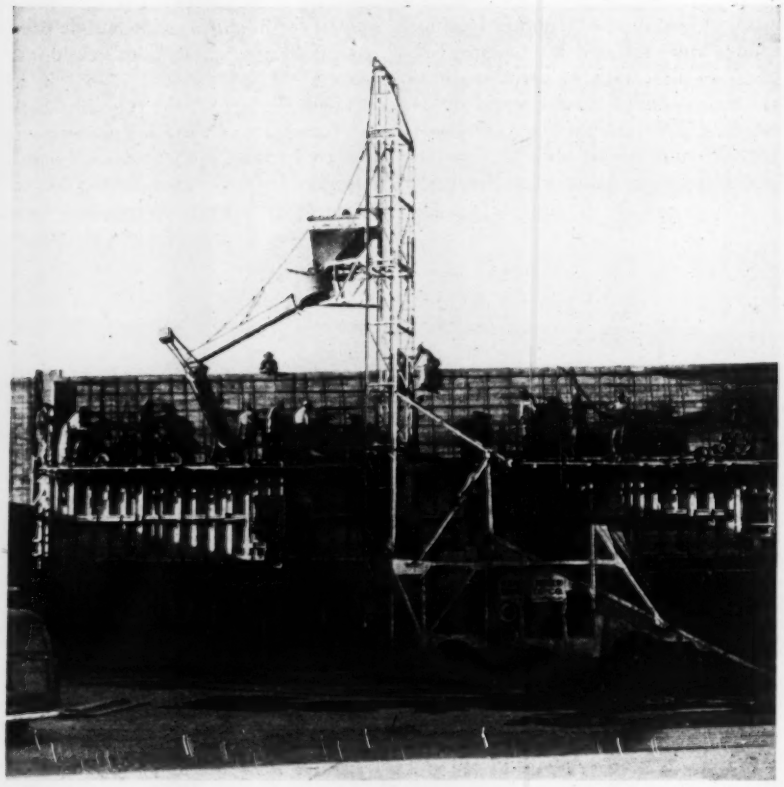


Fig. 4. Concrete for the walls is mixed and placed with trucks operating inside the warehouse on concrete floors laid before wall construction began.

of these rods are cut off after the forms are stripped, the cut ends are all thrown into scrap piles on the floor, both to save steel and to avoid possible damage to truck tires. For the same reason, all nails drawn from the forms in reconstruction work are collected on the floor and sent to the scrap yard. Last winter, when a local scarcity of nails developed, the emergency was met by reclaiming several kegs of nails from the scrap boxes.

In the initial wall-building operations, the exterior walls and slightly more than the outer thirds of the fire walls are built in one continuous operation, leaving the central section of each fire wall to be placed at a later date. This leaves the whole floor area open for delivery and stripping of forms, placing concrete and for delivery, assembly and setting of roof trusses. Corbels to support the truss ends that frame into the fire walls are cast in the initial section so that no truss depends on the uncompleted third of the wall for support. As soon as the trusses in the first bay are set, the missing wall section is poured before truss assembly in the next section starts.

Concreting of the central section of the firewall is done from the adjoining bay where the roof trusses have not yet been set in place. Purlins for the section of roof adjoining the central section of the firewall are set with small hand-operated cranes which can be taken out through the trucking doors.

Roof truss production

Timber for the heavy roof trusses and for the lighter truss frames for the roof monitors is all cut to size in the central carpenter shop, production lines having been set up for the cutting and boring of the 4x14-in. timber making up the principal units of the main trusses. Templets are used for the cutting and to mark the exact spot for bolt holes and ring-connector recesses, the latter being bored by power-driven tools as the truss members move down the line.

All trimmings are reclassified for use in cutting fillers, of which a great quantity is required in the truss framing, and for short lengths of timber needed in the splices.

Trusses are assembled on the floor of the warehouse where they are to be used, and when assembled they are set with a crane working from the floor. End members for the upper

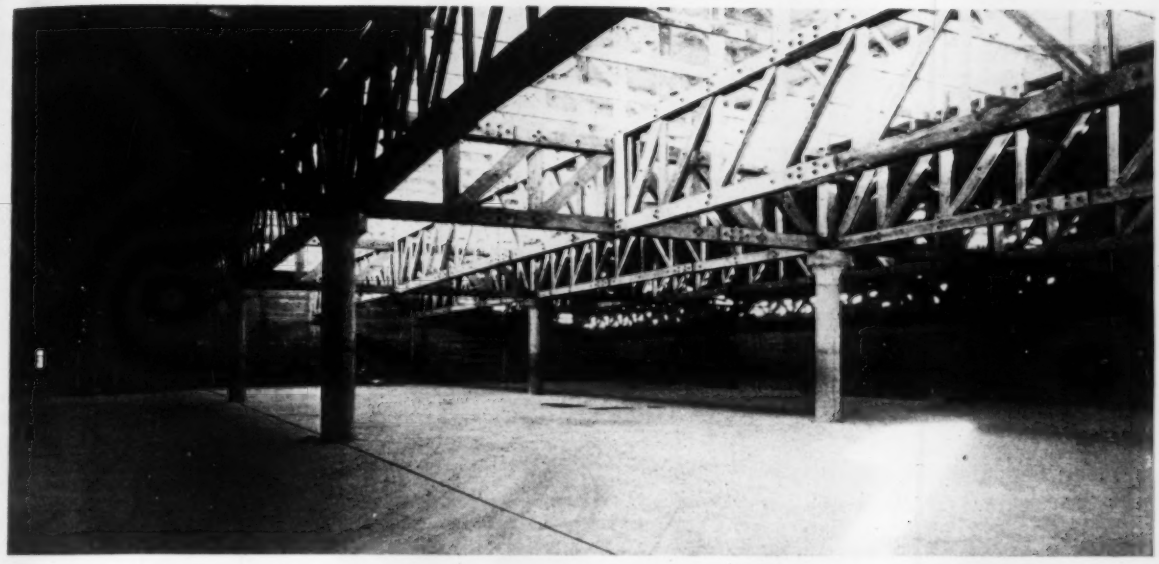


Fig. 5. Truss members are all cut in a central shop but the trusses are assembled on the completed floor and are set by power cranes operating inside the building. Hand cranes were used to set the purlins.

and lower chords are cut 6 in. too long in the shop, the final cut being made to tape measurements after the truss has been assembled to insure a full bearing on the wall plate. Bearing plates for the lower chords are set in grout on the column tops and wall corbels before the trusses are raised to position, and bearing plates under the ends of the top chords (which carry the purlins) are inserted and grouted after the trusses are up. As many as 25 trusses have been set in one 8-hour day.

Production has been at the rate of one complete warehouse for each superintendent in a period of from five to six weeks, working 8 hours a day, 40 hours a week. Building and grading costs average $2.72 per square foot of floor area, and total cost, including land, utilities, service roads and tracks, will be $4.10.

The first concrete went into superstructures early in October. As soon as cold weather became a factor to be considered, the aggregates and water were heated at the batching plant, and live steam was discharged into the drums of the transit mixers at that point. These precautions resulted in no concrete going into the forms at temperatures below 70 deg. Climatic conditions were such that the wood forms provided adequate protection for concrete in the walls. To heat water for the tower mixers, an oil-fired heater capable of making a 100-deg. increase in the temperature of 800 gal. per hour was set on a bracket on the mixer truck frame.

For protection of our country's interests, identification of the site and the personnel on the work must await conclusion of the war.

Fig. 6. Each pair of warehouses is served by three railroad lines with crossovers to facilitate spotting cars. Ultimately the tracks are to be covered with bituminous surfacing to top of rail so that trucks can use the rail platforms if necessary.

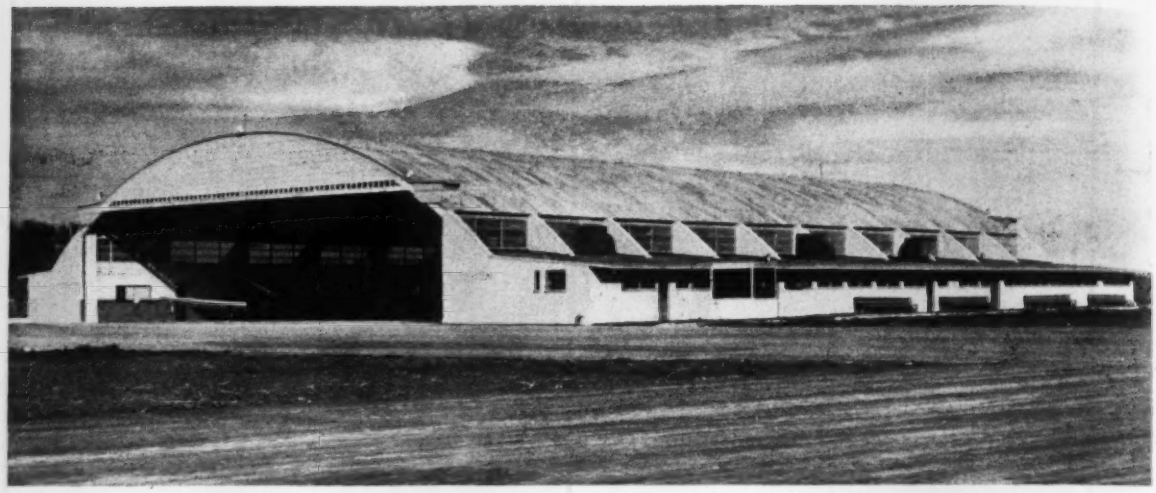


Fig. 1. Wood arches for the structural frame and end doors that disappear below the floor make this hangar unusual.

Collapsible Doors for Airplane Hangars

***Contents in Brief**—Steel-frame doors that disappear below floor level when in the open position are being used on two airplane hangars at Garner Field in Texas to provide 20½x100-ft. end openings. The doors fold into a 5½-ft. deep trench. Their construction calls for an exterior covering of 30-in. wide, longitudinal leaves of sheet metal and these leaves are stacked side by side when the door is lowered into the trench. The hangars are also somewhat unusual because of timber arch ribs used as the structural framing.*

AN INNOVATION in airport hangar construction has been introduced at Garner Field of the Army's Uvalde, Texas, civil elementary flying school in that the doors collapse vertically to disappear into trenches below floor level. Another structural feature, although not new but still unusual, is the use of glued laminated timber arches for the main structural frame.

The new doors are being used on two 100x200-ft. hangars with a 20x200-ft. lean-to along one side and a 30-ft. wide lean-to along the length of the other. Cost of each hangar is $42,500 and this includes the expense in providing toilet and washroom facilities, motor repair shops, a parts department, and a dispatcher's quarters and other offices.

At each end of the hangars one of the unusual doors is used to make possible a 20½-ft. high by 100-ft. wide opening. The doors are of steel construction and each weighs 9 tons. They are so built that they may be collapsed in a vertical plane to fit into a 5½-ft. deep, 20-in. wide trench. The top of the trench is flush with the 4½-in. thick reinforced-concrete hangar floor, and the trench's sides are 6-in. reinforced-concrete walls.

The steel frame of each door consists of two 8-in., 11½-lb. channels as a top chord and an 8-in., 32-lb. H-section for the web members. No bottom chord is required, as the web members at their lower ends are pin connected to shoes embedded in the reinforced-concrete bottom slab of the trench. An 18-gage sheet metal in 30-in. longitudinal widths is attached to rollers on the exterior side of the framework to provide the only covering required. When the door is lowered into the trench, the leaves of sheet metal drop into the trench side by side (Fig. 3). The leaves are broken up by vertical expansion

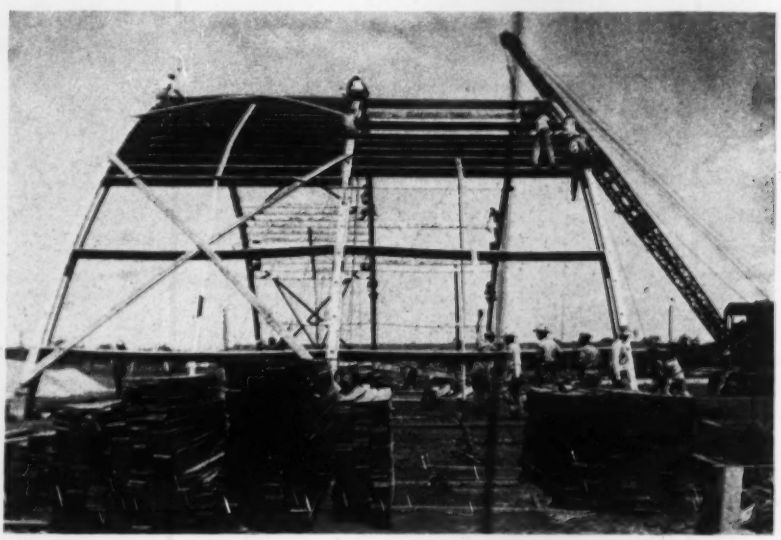


Fig. 2. A crawler crane erects as a unit the two 1½-ton sections for each of the arch ribs. Note how purlins are supported on the wide width of the ribs.

joints on 10-ft. centers and these joints are so designed that the leaves are interlocking through their entire length, whether the door is fully or partially raised.

Advantages claimed for this type door include: No heavy superstructure is required to support the door, as it is designed to withstand a 75-mph. wind while standing alone in the raised position; door operates free of hangar frame except for vertical guides at each end of the door opening; and quick operation. For control of each door already installed a 7½-hp. electric motor operating a tapered winch and cable system in the middle of the door frame (Fig. 6) is employed. This method requires about 1½ minutes for opening or closing the door. However, for future installations a simple, hydraulically operated control has been designed so that the doors may be raised or lowered in 10 seconds.

With the four collapsible doors built to date, two are of wood-frame construction and two are steel-frame members. However, the former were not as satisfactory as those entirely of steel, since to keep the several pin connections tightened is more difficult than with the steel frames. Thus, wood-frame doors will not be employed in the future. Also, with the doors now in place all erection and adjustments were in the field, but the plan for the future is to provide doors of standard size, already adjusted, and ready for use by simply attaching the door members to bolts previously placed in the trench.

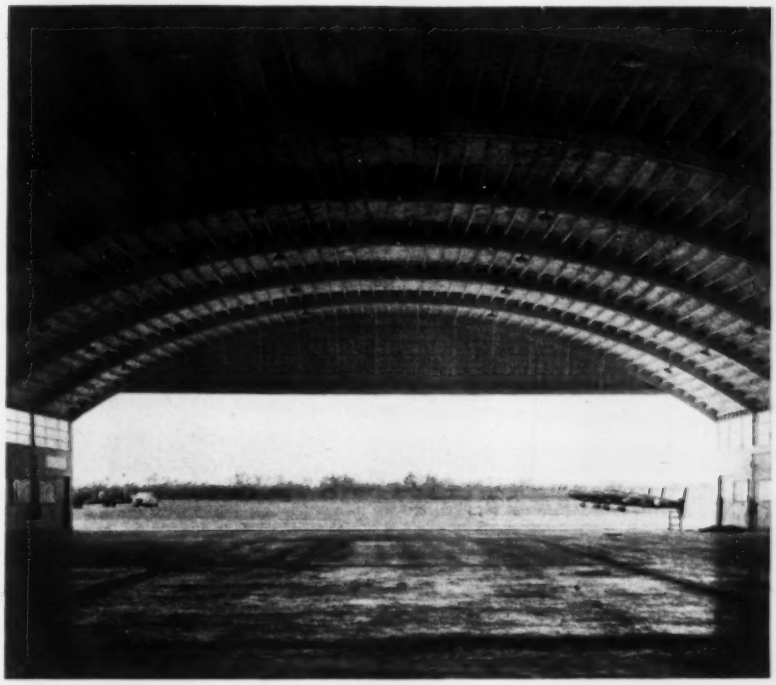


Fig. 3. The collapsible end door makes possible a 20½x100-ft. opening. Roof consists of the timber ribs on 20-ft. centers, 2x10-in. purlins on a 2-ft. spacing, diagonal sheathing, and galvanized metal roofing.

Fig. 4. After structural work is complete and major settlement has occurred, anchor bolts at the reinforced-concrete footings are embedded in concrete to make fixed-end connections for the arch ribs.

Arches save steel

The second unusual feature of the hangars is the use of glued, laminated-timber arches for the main structural framing. Great advantage of the arches is that they save large quantities of steel; a 100x200-ft. steel-frame hangar requiring about 105 tons of structural steel, while the hangars built at Garner Field with steel-frame doors required but 20 tons. The arch ribs are of 135-ft. span and 35½-ft. rise and are on 20-ft. centers. They are of three-hinged construction and are fabricated on the site with casein glue from random lengths of 1x10-in. and 1x6-in. long-leaf yellow pine.

Each rib is fabricated in two 1½-ton sections. These form a thick T-shaped rib with the width (dimension perpendicular to the exterior wall) 23 in. and the thickness 10 in. at the inside face and 6 in. at the outer face. This difference in thickness makes possible support of the 2x10-in. yellow pine purlins, which are on 2-ft. centers, on the arch ribs without any special connection being required (Fig. 2).

In erection of the ribs the two sections are laid flat on the ground,

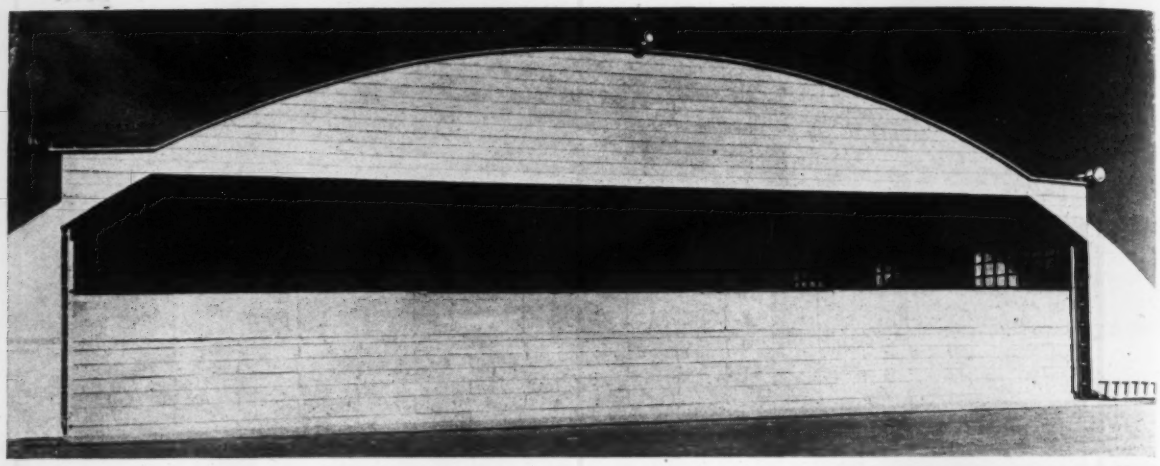


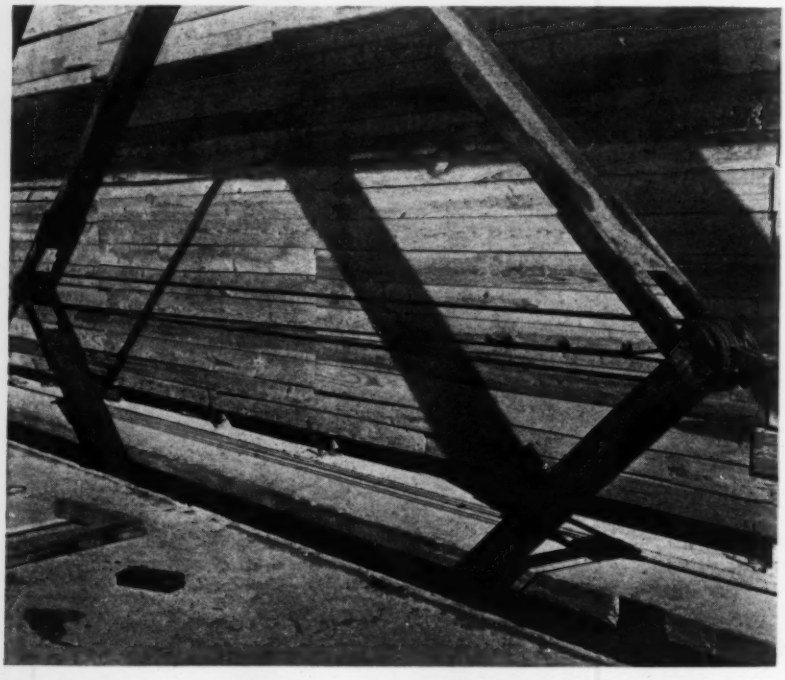
Fig. 5. A completed end door in operation. Note the longitudinal lines indicating how the door leaves lap each other.

the top hinge installed, and heavy timbers lashed to the rib near the hinge for bracing. A crawler crane with a 50-ft. boom then lifts each arch rib into place as a unit. At the footings, which are 3x4-ft. reinforced-concrete blocks extending two feet below grade line, the ribs are fastened by two $1\frac{3}{4}$-in. dia. anchor bolts. After the hangar is complete and the major settlement has occurred the ends of the arch ribs are grouted in place with dry concrete to make for fixed connections at the footings, which are joined by two 1-in. square tiebars.

To complete the roof 1-in. thick, diagonal, yellow pine sheathing is nailed to the purlins and arch ribs. Then over this a galvanized metal roofing is placed.

Side and end walls of the hangar are of frame and stucco construction. The wall area above the disappearing doors is wood-frame construction covered with 26-gage galvanized iron.

Erection of the 11 ribs and about one-third of the purlins for one hangar is carried out by 25 men in an 8-hr. day. One entire hangar can be built in four weeks by an average crew of 35 men. Design and construction of the hangars was by Younger Engineering Company, San Antonio, Texas.



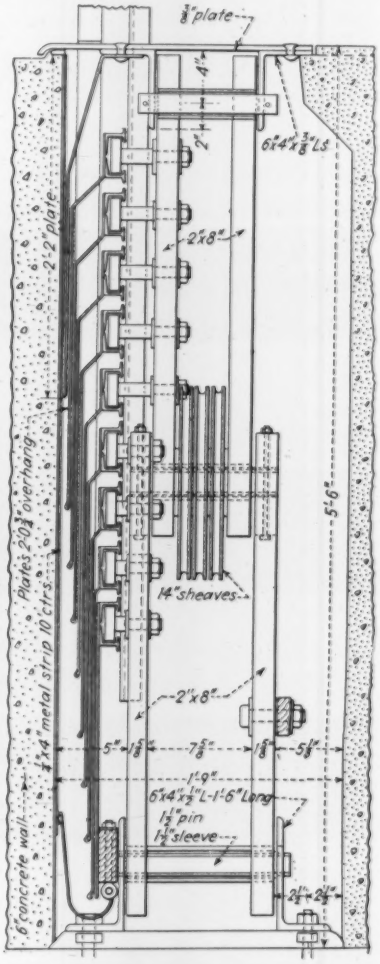


Fig. 6. Central framework of one of the collapsible doors is shown by the photograph above, which was taken before the door's exterior sheet-metal covering had been added. Drawing at right illustrates how a wood-frame door folds into a 5½-ft. trench. Details for steel-frame door are very similar.

Sewerage Design For Housing Projects

***Contents in Brief**—Design standards for storm and sanitary sewer facilities on public housing projects are outlined. These standards form part of the official site engineering recommendations prepared by the Federal Public Housing Authority to expedite construction of projects.*

ONE of the major improvements to be considered in the development of tracts of land for war housing projects is the installation of storm and sanitary sewer facilities. To guide engineers in the design of such facilities the Federal Public Housing Authority has prepared standards which, on the basis of experience and field study, will best serve housing project needs.

The following outlines the official recommendations promulgated for use on all public housing work.

The method for disposing of domestic sewage from the project—whether by means of existing sewers or otherwise—should be determined, if possible, at the time the site is selected. General policies to be observed in such determination are:

(1) Provide for the discharge of project sanitary sewage into existing sewers (or sewers provided by the local government) when it is by any means practicable to do so—even if it is necessary to pump the sewage and conduct it for a considerable distance, and even if estimates indicate the first cost and/or the operating cost will be appreciably greater by this method of disposal than by either of the following.

(2) When no existing sewers are available, and none will be made so by the local government, provide for collecting sewage from the entire project, treating it as required by state health authorities and discharging it into a natural water course, whenever this method is feasible.

(3) Resort to sewage disposal by septic tanks and tile beds only when methods above are impracticable, and then only when percolation tests have been made to prove that the method can be employed safely.

When this last method is adopted, employ State Board of Health requirements and the finding of the percolation tests to determine the yard space required for tanks and tile beds, bearing in mind that tile beds must be abandoned after some years of use and new beds provided. Space project buildings accordingly.

Make an investigation of existing sewers to determine whether they will be adequate at all times to carry away sanitary sewage and storm-water without overflow or back-flooding. This is important both in connection with site selection and project design—especially so in the case of a combined sewer system to which basement drains will be connected.

General design of sewers

In the general layout of sewer lines:

Locate sewers in or along project streets and driveways so far as feasible.

Design main and lateral sewers in straight lines and at uniform grades, insofar as the site plan and topography permit.

Coordinate the sewer design with that of other utilities; check particularly for conflicts in the grades of storm and sanitary sewers.

Lay out sewers so as to avoid existing trees which are to be preserved.

Provide manholes on all sewers (1) at intervals of not more than 400 ft.; (2) at definite changes in direction or breaks in grade; and (3) at junctions of main sewers and principal laterals. Some exception to this rule may be made where, due to rugged topography, excessive cost would be involved.

Provide clean-outs at the upper end of sanitary sewer laterals (except when the lateral is not over 150 ft. in length from a manhole) and at changes in direction where manholes are not proposed. Where sewers are quite shallow and are located in unsurfaced areas, clean-outs need not be brought to the ground surface.

Show clearly on the sewer plans the locations and necessary invert elevations of all lines, also existing ground contours and finished grades at buildings and at occasional intervals along roadways, walks, etc. Sewer profiles will be required only at the direction of the construction agency.

Sanitary sewer considerations

Design sanitary sewers for a maximum flow of about 600 gal. per day per dwelling unit with sewers flowing half full. Make additional allowance for infiltration if the lines are to be laid in water-bearing sand.

House connections to sanitary sewers may be 4 or 6 in.; short laterals generally should be 6 in. All other sanitary sewers, particularly those in streets and drives, must not be smaller than 8 in.

Where sufficient fall can be had without laying sewers at excessive depths, provide grades that will produce a velocity of at least 2 ft. per second, with sewers flowing full.

Sanitary sewers are in no case to be laid in the same trench with water supply piping. Also, avoid any sur-

Trenching machine expedites sewer installation on a housing project.

face drainage connections to separate sanitary sewer systems.

When a sewage pumping station is necessary, provide two pumps, each capable of handling the maximum rate of sewage flow, the pumping equipment to be located in a dry well. Design the sewage sump of such capacity that float settings will permit at least a 15-min. operation of one pump. Whenever possible, provide an overflow from the sewage pump, such overflow to operate only in case of power or pump failure. The size of the discharge line from the pumping station should be large enough to carry the discharge from both pumps operating simultaneously.

Storm and combined sewers

Storm sewers must be provided to the extent that, in the project grade design, surface drainage cannot be shed directly into public streets. Employ the rational method in the design of storm and combined sewers. The sanitary sewage flow may generally be disregarded in combined sewer design.

Assume a rainfall frequency in each case related to the risk involved. For example, if the only result of surcharging a storm sewer will be some little ponding between street curbs, a two-year rainfall frequency (corresponding, say, to a rainfall rate of 2 to 3 in. per hour) may be deemed satisfactory, while if the sewer drains a deep "pocket" and inadequate capacity might result in serious property damage, a frequency of 25 years or more (corresponding, say, to a rainfall rate of 4 or 5 in. per hour) may reasonably be assumed. Rainfall rates may be taken from local records.

For convenience, sewer sizes may be taken from Fig. 2. If the rainfall rate varies from that upon which the chart is based, adjust the drainage areas proportionately.

When sufficient fall can be had without laying the sewers at excessive depth, provide grades for storm and combined sewers that will produce a velocity of at least 2½ ft. per second, with sewers flowing full.

Minimum pipe sizes for storm and combined sewers are as follows (these do not apply in regions having a very low rainfall intensity):

Sewers draining streets and main drives	12 in.
Sewers draining service drives	10 in.
Connections to stormwater inlets in streets and main drives	10 in.
Connections to stormwater inlets in service drives	8 in.
Connections to stormwater inlets in yard areas	8 in.
Downspout connections	6 in.

Stormwater inlets must be located at points determined by the grade design. However, the sewer designer should check the need for and the adequacy of inlets so located. (The grading and the storm sewer design can be performed advantageously by the same engineer.)

In general, use catch basins with trapped outlets on combined sewers, and simple inlets without catchment space on storm sewers. Arrange drainage facilities in such way that reliance will not be placed on the functioning of single stormwater inlet or drain, if its stoppage would cause the flooding of a building floor or other serious damage. Inlet gratings should be set 2 or 3 in. below finished grade.

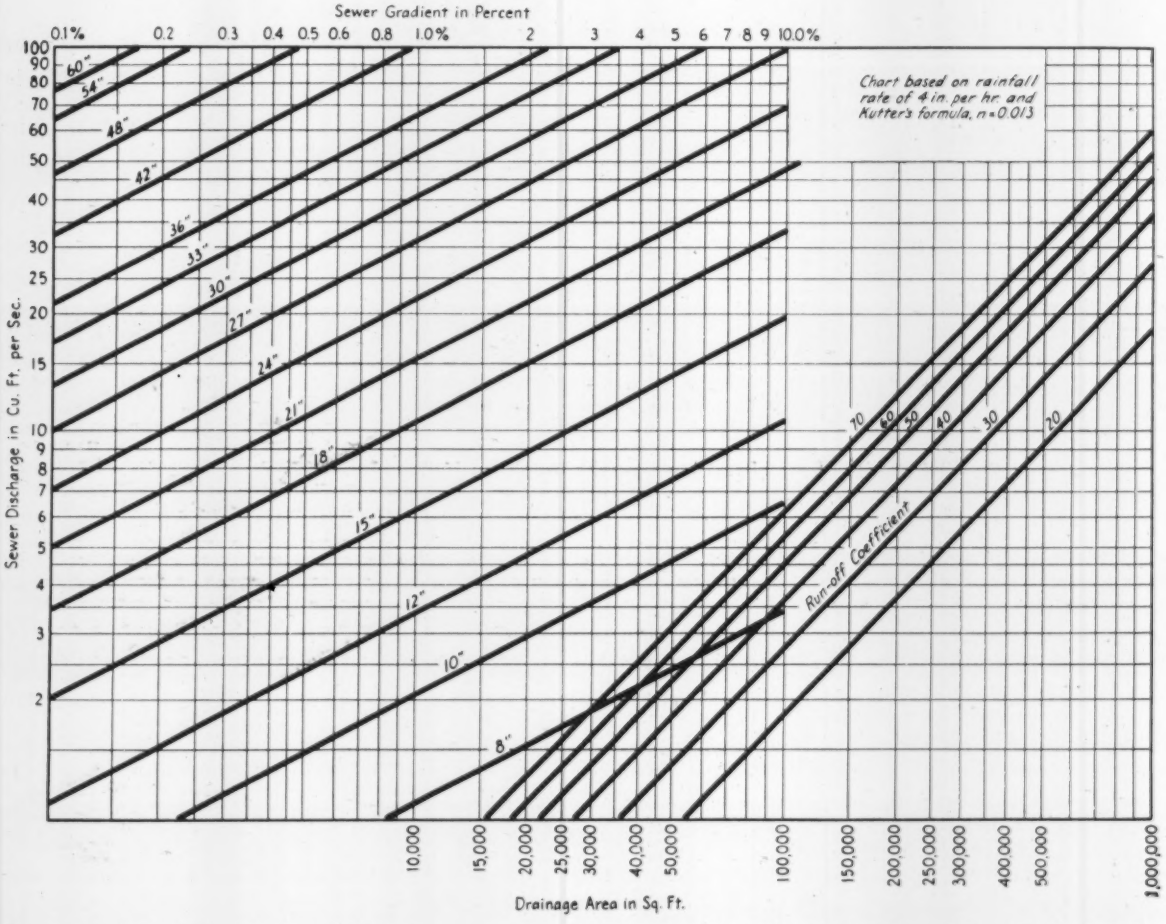


Fig. 2. Chart to aid in selecting proper size of storm sewer in accordance with rainfall rates and areas to be drained.

Vinsol Resin—A New Soil Stabilizer

***Contents in Brief**—Small amounts of Vinsol resin added to certain soils make it possible to convert these soils into a firm base for road construction. Attention is thus focussed on a new technique in soil stabilization that has been quietly studied in the laboratory and tested in the field for several years. Construction methods for Vinso-treated roads and some of the limitations to the use of this material are outlined.*

A REVOLUTIONARY APPROACH to "waterproofing" soil by the addition of small amounts of Vinsol resin has found practical application in road stabilization work. Several years of quiet research and field experimentation conducted by the Hercules Powder Company, producers of Vinsol resin, have shown that this material may be employed as an agent to prevent excessive moisture from entering a compacted road base either through the subgrade or from the surface.

Interestingly enough, a complete hypothesis of the action of Vinsol resin in soil stabilization has not yet been determined, but enough practical work has been carried out on test roads in Georgia, Mississippi, South Carolina, Florida, and Delaware, to define methods of application and quantities required to obtain specific results. Perhaps the most plausible theory concerning Vinsol is that this material forms a water-repellent envelope around soil particles. Thus, a Vinsol-stabilized soil will lose moisture, but it cannot be "wetted" provided the proper degree of compaction has taken place.

Vinsol is a powdered, resinous material, one of the products derived from the steam-distilled wood naval stores industry, which utilizes pine stumps as the basic raw material. The following report on the results and application of Vinsol resin is based on information supplied by the Hercules Powder Company.

Among the typical field applications is one located in Mississippi on Route 20 between Laurel and McGee. This job, consisting of about one mile of road, was constructed in August, 1939. The soil varied from an A-7 to an A-1 (Public Roads Administration classification), with the A-4 group being predominant. The quantity of Vinsol required varied, depending on the type or soil, and the Vinsol was applied from a distributor in a slurry form.

Another application of a Vinsol-treated base was made at a naval air-base in Florida. Here the project involved the treatment of 30,000 sq.yd. of streets and parking areas. This soil consisted principally of the A-2 group, and required 2 lb. of Vinsol per square yard for a 6-in. compacted depth. Before Vinsol was introduced on this project, it was impossible to move trucks and equipment over the base after a rain without causing severe rutting. However, after the Vinsol treatment no rutting was experienced.

At a naval housing project in Mississippi, some 120,000 sq.yd. of streets were treated with Vinsol. This soil was of the A-3 group and required 8 lb. of Vinsol per sq.yd. for a 6-in. compacted depth. However, by adding gravel to the soil it was possible to reduce the Vinsol content to 6 lb. per sq.yd. The location of this housing project was in a low swampy area only 8 to 10 ft. above sea level. In its natural state the subsoil remained partly saturated; even after drainage operations were completed the water table was only about 18 in. below the surface. Construction plans called for 18-ft. streets with 18-in. concrete curbs forming a gutter of 6 in. in depth. Because of the extremely poor conditions for road-building, it was decided to prepare a base by blending 2 in. of gravel to a depth of 12 in. with the native soil after which the upper 6 in. of the base was treated with Vinsol. Following this the base was primed with tar and given a double bituminous treatment using slag.

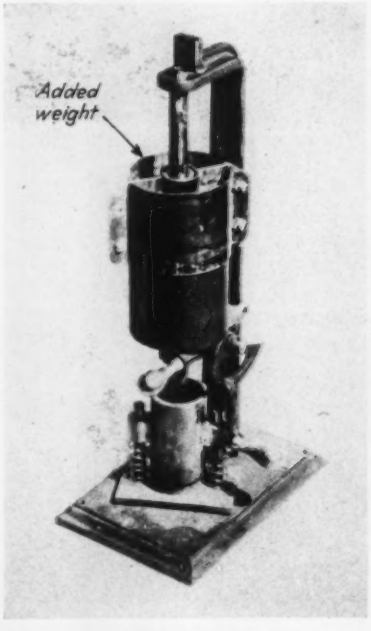
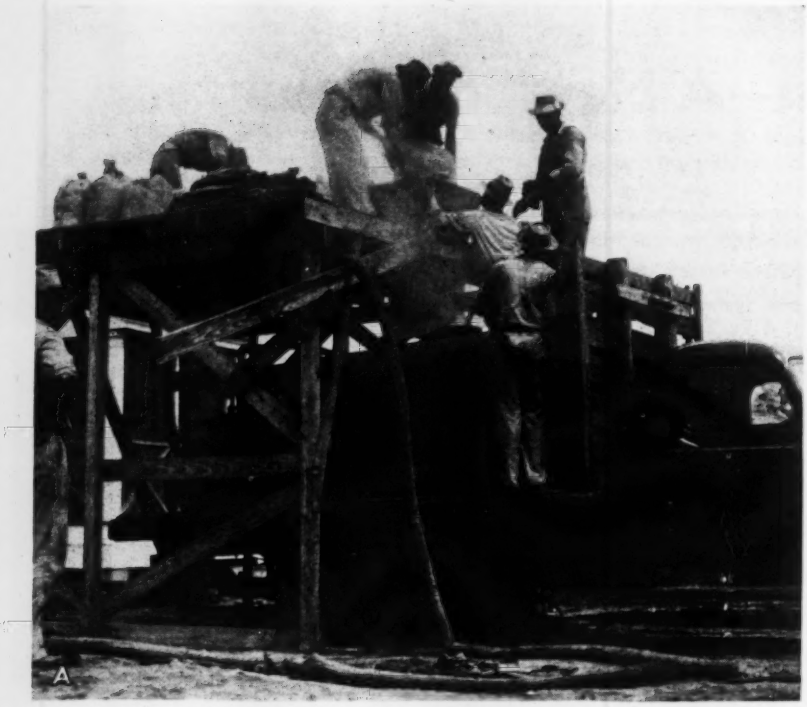


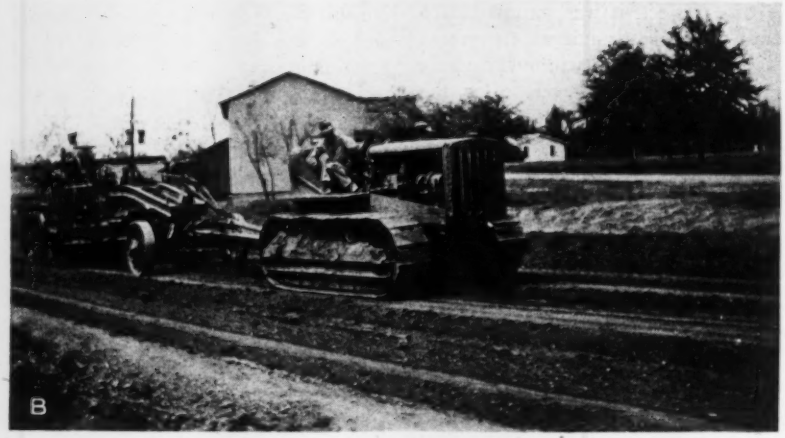
Fig. 1. Specimens are formed in this core-making apparatus.

This job was construced in August, 1941. After going through a winter there were about 25 percent failures due to bad subgrade condition. Where the surfacing was placed on an unstable base some of the failures were apparent before the job was completed.

An attempt was made to treat the soil used in the streets of the housing area at a Louisiana army air station, but due to the very wet subgrade condition it was impossible to dry this subsoil sufficiently during winter construction to obtain adequate load-bearing capacity. The soil had a very high silt content and the more it was agitated the more water it would draw up from below. Vinsol treatment was abandoned and the subsoil and base were stabilized by mechanical means using gravel.

Another application of Vinsol in soil treatment consisted of shoulder work on the U. S. Route 52 between Monks Corner and Charleston, S. C. This work was done by the South Carolina highway department maintenance forces. The section treated was 1,062 ft. long, 4.5 ft. wide and 6 in. deep. The soil consisted of 4 in. of an A-2 material blended with 2 in. of an A-7 type; the sub-base was an A-7 soil. Vinsol was applied here in





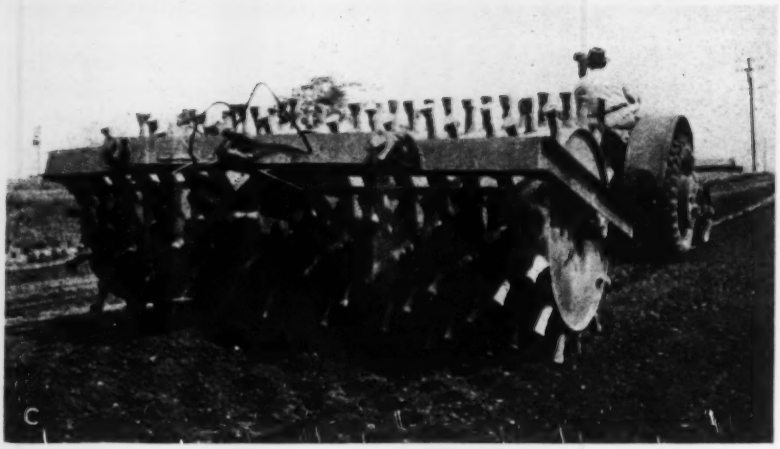


Fig. 2. Construction procedure on a Vinsol-treated road base in Mississippi: (A) preparation of Vinsol slurry; (B) mixing Vinsol into the soil after scarifying has been completed; and (C) compaction with a sheepsfoot roller.

the dry powdered form using 7 lb. per square yard.

Other places where Vinsol treatment has been used for soil stabilization include a naval air field in Virginia, and army air fields in Alabama and Florida.

Limitations of treatment

One point to be emphasized is that *Vinsol is not a cure-all for soil stabilization.* It has definite limitations. For example, it cannot be used in a soil that does not contain sufficient nutural binder to bond the soil particles together. Vinsol does not lend any bonding power—it merely makes it possible to obtain the maximum stability from a soil by preventing excessive moisture from entering and causing instability.

Vinsol should not be used in a soil that may be subject to excessive volume change, such as the heavy A-7 or A-8 type. Although Vinsol will keep out a large portion of the moisture that ordinarily would be absorbed by this type soil, the quantity that is absorbed may be detrimental.

Another limiting factor in the construction of a Vinsol-treated base is moisture control. Treated soil must be dried below optimum moisture content before the Vinsol produces its best water-repellent action; during the winter period the "drying out" operation is accomplished with difficulty. Although some water-repellent action is observed when Vinsol is added at optimum moisture content, the drier the soil becomes—to a certain point—the more water-resistant it becomes. However, if the soil is allowed to become bone-dry the treated soil loses its water-repellent action again.

An important consideration to be kept in mind is that no treated or stabilized base should be constructed on a subgrade that does not have adequate load-bearing capacity. Unless the base is of a rigid type the load is transmitted from the base to the subgrade. Therefore the nature and physical characteristics of the subgrade should be studied at the same time the soil survey for the base is made.

How Vinsol use is determined

Application of Vinsol resin is determined on the basis of laboratory analysis and soil surveys. The typical procedure is as follows:

Visual inspection of the soil to be

treated is made at 200-ft. intervals, and at each point where a change is noted a large sample (about 20 lb.) is taken. This soil change may be detected by comparing the samples previously taken with the one at hand. Notes are kept on the soil changes so that a flow sheet may be made showing from station to station where the difficult type soils are located.

Samples then are sent to the laboratory where mechanical analyses are made and soil constants determined. Test samples that show similar characteristics are combined to form a single sample. On these composite samples the mechanical analysis and soil constants also are determined, alone with tests for optimum moisture content and maximum density.

Following these determinations specimen cores are made (2 in. in dia. by 1½ in. high) from each different type soil using varying quantities of Vinsol in each core, the amounts proportioned in the ratio of 1, 3, 5 and 7 lb. per sq.yd. for a 6-in. compacted depth. With most soils it has been found that the additon of a small amount of caustic soda in the mixing water reduces the required quantity of Vinsol.

In making the specimens the required quantity of dry Vinsol is added to the soil after which the soil is brought up to 90 percent of optimum moisture content. The soil then is compacted to about the same density as is obtained at 100 percent optimum moisture. The apparatus used for forming these specimens is shown in Fig. 1; the 100 percent density is obtained at 90 percent optimum moisture by adding the extra weight shown at the top of the compactor. This machine gives the same density as the standard Proctor equipment.

When each specimen is formed, a sample for moisture is taken from the same batch. The specimens are marked, weighed and placed on a perforated shelf about ¼ in. above water; the specimens are turned over once every hour so that they will cure uniformly. At night the specimens are covered so that close control can be kept on their weights.

The specimens are cured thus until it is determined by their weight that the moisture content is between 50 and 60 percent of optimum moisture; a moisture content of 50 percent is used for sandy material and 60 percent for clay material. After the specimens have cured to the specified weights they are placed in a closed container in ¼ in. of water. Care is taken so that the container is tight enough to prevent surface evaporation of the specimens, otherwise some of the specimens may weigh less after being exposed to water. The cores are weighed after 2 and 24 hours and the percent of moisture based on the dry weight of the specimens is calculated.

The quantity of Vinsol that prevents the specimen from picking up moisture beyond 75 percent of the optimum moisture value in 24 hours, and that also prevents appreciable slaking around the specimen, is considered sufficient for the necessary water-repellent action in the field.

At the present time compression tests are being conducted on confined specimens before and after exposure to water, as well as tests on the frost-heave action of Vinsol-treated soils. However, these tests have not advanced far enough for publication.

Purdue University has done some work on the frost-heave action of soils using different type stabilizers, among which was Vinsol. Information on these tests is given in the university's *Engineering Bulletin*, Vol. 24, May, 1940. Among other things it was found at Purdue that Vinsol-treated soils, if dried to the proper moisture content, showed no frost heave. However, the specimens that were tested at optimum moisture content or at very low moisture content did produce heaving due to ice crystals.

Construction methods using Vinsol

First step in the construction of a Vinsol-treated base is the removal of

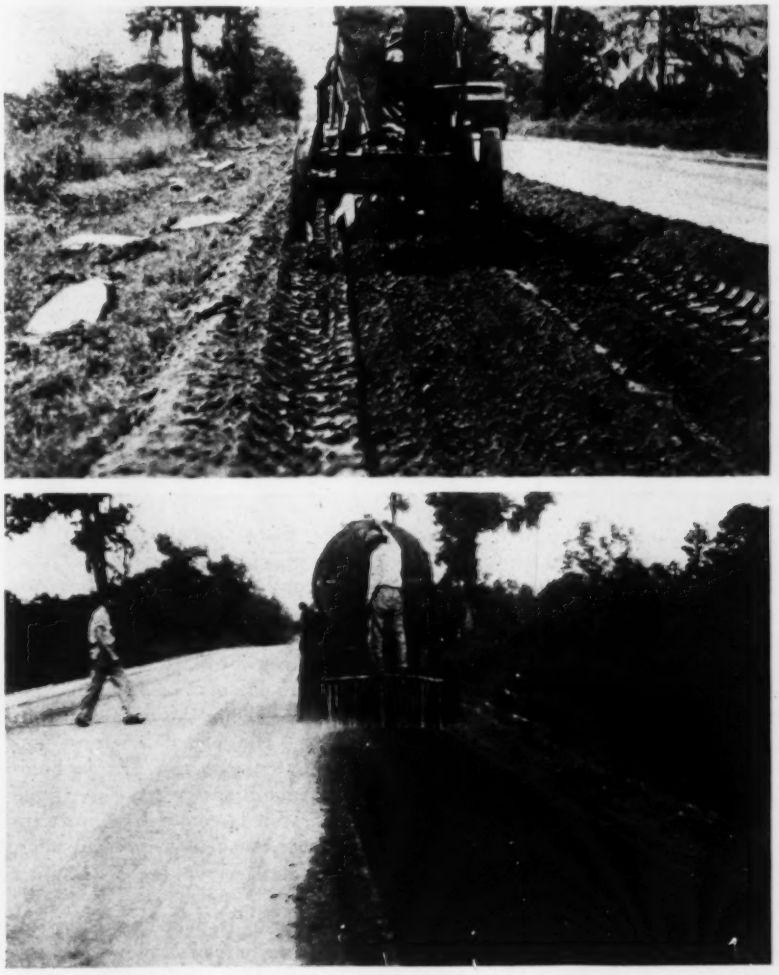


Fig. 3. Initial steps in stabilizing road shoulders with Vinsol resin: (Top) Dry, powdered Vinsol is mixed intimately with the soil to a depth of 6 in. Then (below), water is added to insure proper compaction at optimum moisture content. (Also see Fig. 4.).

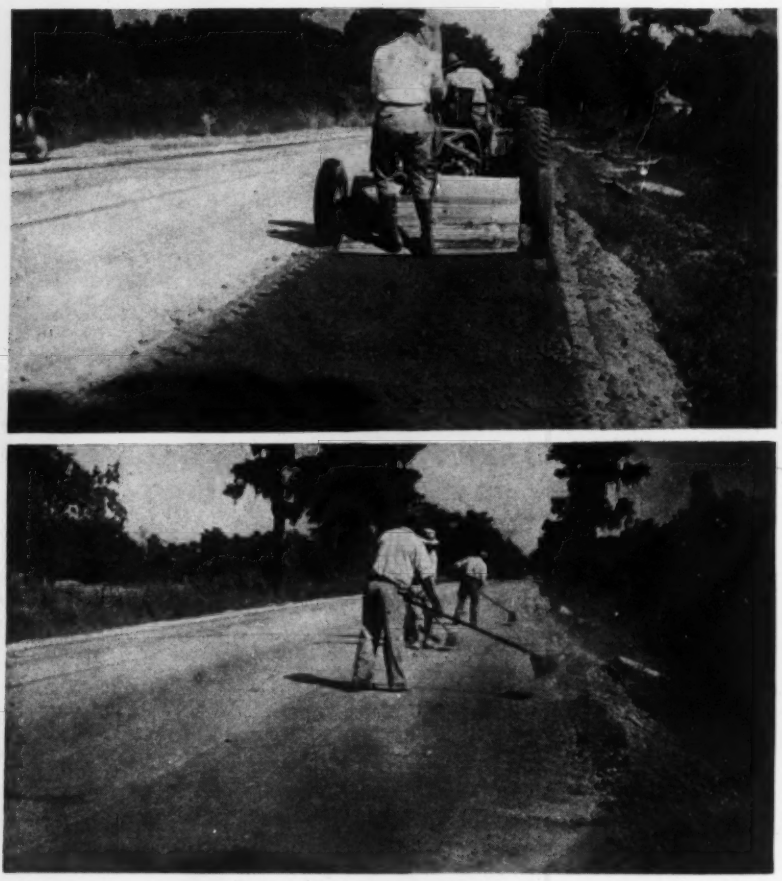


Fig. 4. To complete the stabilization of road shoulders (Fig. 3) a final mixing is given with a rotary soil tiller (top), after which compaction is secured with sheepsfoot and rubber tire rollers. Then the surface is broomed (lower view) and primed with asphalt cutback.

all vegetation or sod to a depth just below where the sod ends. Adequate drainage should be made available so that no water remains in the berm ditches for any length of time after a rain.

The soil to be treated then is scarified to the full specified depth. After longitudinal scarifying has been completed it may be desirable to operate the scarifier diagonally from one side of the road to the other in order to break up any grooves that may have been formed. On roads where fast or heavy traffic is expected, nothing thinner that a 6-in. treated base should be used. Thicker bases should be used where the subgrade is not very good or where unusually heavy traffic is anticipated.

Vinsol may be introduced into the soil in two different ways: (1) in a dry, powdered form, and (2) in a slurry form. Application of the powdered form is as follows:

The quantity of Vinsol per square yard to be used is based on the laboratory reports, and from these data can be determined the surface area to be covered by one 50-lb. bag. The bags then are spotted along the edge of the roadway at proper intervals. For example, if laboratory tests showed that the soil required five pounds of Vinsol per square yard for a 6-in. compacted depth and the roadway to be treated was 18 ft. wide, each linear foot of roadway has an area equivalent to 2 sq.yd. and would require 10 lb. of Vinsol. Thus, the 50-lb. bags should be spaced at 5-ft. intervals. The Vinsol is spread uniformly over the 5x18-ft. area by holding the mouth of the bag close to the ground as it is emptied. A mechanical device, such as a lime spreader, is very satisfactory for distribution purposes.

The Vinsol is mixed into the soil using disk harrows, plows or any other suitable mixing equipment, after which the soil is sprayed with a caustic soda solution. The quantity of caustic soda is 1.7 percent, based on the weight of the dry Vinsol used; the volume of water in which this solution is made depends on the moisture content of the soil.

If the soil already is wet, then the less water added the better, but if the soil is dry and requires additional water the concentration of the solution can be reduced. For example, if for a given area 5,000 lb. of Vinsol has been spread and mixed into the soil, then 85 lb. of caustic soda is needed. The required quantity of water is placed in the tank of the distributor and the caustic soda added to it. Mixing the caustic is accomplished either by means of a long paddle or by closing the top of the distributor tank and having the truck move forward with a jerky motion.

After the alkali solution is sprayed on the soil, further mixing of the Vinsol with the soil is carried on until a uniform color is obtained throughout the mix and until not less than 80 percent by weight (exclusive of gravel, etc.) passes a No. 4 sieve. Care must be taken that the mixing equipment penetrates to the full depth to be mixed.

If the compacted soil depth is greater than six inches, the mixing should be done in layers, the bottom layer being mixed and compacted before the next layer is brought in. Near the end of the mixing period samples of soil should be taken at various points and tested for moisture content. Under very wet winter construction Vinsol may be used without the addition of caustic. However, this usually requires about 20 percent more Vinsol.

Application of the slurry

Vinsol slurry is prepared and introduced into the soil in the following manner:

The slurry is prepared in a tank equipped with a circulating pump and return hose to keep the material agitated. The tank is half-filled with water; flake sodium hydroxide is then added in an amount equal to 1.7 percent of the Vinsol to be used. Vinsol is then stirred into the alkaline water in an amount not to exceed 3 lb. per gallon of final slurry. Finally, sufficient water is added to completely fill the tank.

After the slurry is made, it is sprayed on the soil through a spray bar with the aid of a pump, or it may be fed by gravity. It is then thor-

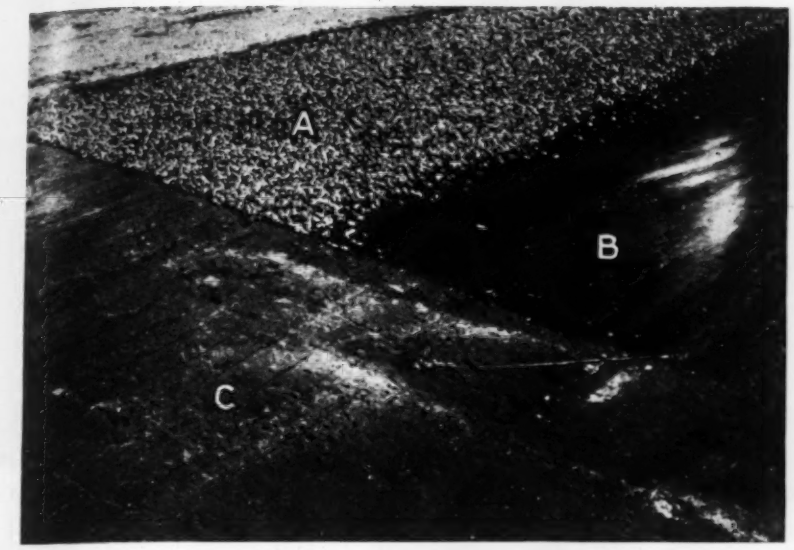


Fig. 5. Bituminous surface treatment on a stabilized base includes: (A) Coarse slag spread on (B) a hot asphalt application over (C) the primed base.

oughly mixed into the soil my mechanical means using a disk harrow, blade graders and plows.

At the end of the mixing process, the moisture content of the soil should be between 75 and 90 percent of optimum moisture. When it is desired to maintain the finished base at a definite elevation—that is, to prevent additional consolidation after the roadway is open to traffic—it may be necessary to compact at 95 to 100 percent optimum moisture should the compacting equipment fail to produce 100 percent Proctor density at the reduced moisture content.

Before compaction begins the soil is brought to the proper grade and elevation. It is most essential that all low places be brought to grade because it is practically impossible to compact an added thin layer of soil and thus bring up the surface to final grade. Compaction may be done with sheepsfoot rollers, rubber tire rollers, or any other type roller that will produce the required density. If the sheepsfoot is used and the soil is very heavy and plastic, a spring-tooth or spike-tooth harrow should be dragged behind the sheepsfoot to break up compaction planes made by the tractor treads.

After the sheepsfoot "walks out" to within 1½ in. of the top of the surface, it should be removed and the final compaction accomplished with a smooth rubber tire roller.

Density determinations should be made after each day's construction. Any compacted base that is less than 85 percent Proctor density (unless 100 percent Proctor density is required to maintain a definite elevation) should be salvaged by reworking the mixture and recompacting, or by merely continuing compaction until the required density is obtained.

Finishing and priming

After rolling is completed, the base should be bladed by working from the center of the roadway toward each edge. A very slight cut should be made by the blade in all cases so that a firm base remains with no loose soil on top. This roll of soil should be removed so that surface water may have free access to the drainage ditches. When the blading is completed, the base should be rolled again with the rubber tire roller to seal the surface against the effects of an immediate rainfall.

During the curing period and before the base is primed, all traffic should be kept off the base except equipment that may be necessary for maintenance. The base is allowed to cure until samples taken from the top half indicate that the moisture content is between 50 and 65 percent of optimum; the value of 50 percent is for sandy soil, and the 65 percent value applies to plastic soils.

After the base has reached the required moisture content, it is swept clean of any loose material and primed with a light tar or cut-back. All blisters occurring in the prime coat should be broomed out. The prime is applied hot enough so that the material flows readily upon striking the base. After the prime has been dried, a wearing surface of not less than ¾ in. thickness is used.

SPECIFICATIONS FOR VINSOL RESIN

	Maximum	Minimum
Melting Point	125°C.	110°C
Acid Number	105	80
Gasoline Insoluble	20%	.....
Toluol Insoluble	25%	8%
Acetone Insoluble	2%	.....
Ash	0.30%	.....
Methoxyl content	7%	5%
Noncarboxylic Hydroxyl content	13%	7%
Furfural content	0.10%	0.01%
Screen Analysis		
Pass 30 mesh	.....	100%
" 80 "	.....	90%
" 200 "	80%	60%

In summary, it can be stated that Vinsol resin can be applied satisfactorily to any soil that—according to laboratory tests—will not pick up after treatment more than 75 percent of optimum moisture in 24 hours, and that does not show any appreciable slaking or swelling. However, this is true only if the soil can be dried satisfactorily in the field and provided the sub-base has sufficient load-carrying capacity. Vinsol should not be used in soils that are too sandy to produce satisfactory bond, or in very heavy, gumbo-type soils. Furthermore, a treated base must be allowed to dry back to 50 to 65 percent of optimum before sealing in order to obtain the highest water-repellent action. And it must not be allowed to become too dry before priming because it will dust badly. If these precautions are observed, Vinsol-treated soils will produce a relatively cheap, satisfactory base.

Traffic Lights Dimmed

To safeguard traffic during a blackout, the Michigan Highway Department is making tests on the possibility of dimming traffic lights to the point where they cannot be seen at an altitude of over 1,000 ft. above the ground. The first test of this system was made early in April at the intersection of U. S. Route 16 and State Route 78 between Lansing and East Lansing. Despite unfavorable weather conditions, the dimming test proved successful, only two violations of the signals being observed due to failure of motorists to see the "blackout" lights.

The plan calls for use of present electric signal equipment, with voltage cut down 80 percent by use of transformers. This permits the lights to be visible for traffic control purposes, but makes them invisible from 1,000 ft. or more in the air.

Big Trusses For Tallest Dallas Building

***Contents in Brief**—Under construction at Dallas is a 433-ft. high building that utilizes 50-ton trusses of 61-ft. span and 14½-ft. depth. The trusses carry 28 floors of the building and are joined to the supporting columns by unusually heavy gusset plates. The wind bracing system makes each bent carry its share of the load. Two air-conditioning systems are employed, one for exterior and one for interior rooms.*

FOR the $3,500,000 Mercantile Bank Building now being built at Dallas, Tex., 50-ton trusses are being used to make possible a 61x160-ft. area free of columns for the main banking room on the second floor. This 433-ft. high structure, which will be the tallest building in Dallas, is also notable for several other reasons. These include: (1) the method of joining the large trusses to the supporting columns; (2) the use of extremely light floors; (3) locating the bank on the second floor instead of the first; (4) the type of bracing used to transfer wind loads to the columns; (5) the use of two air-conditioning systems; and (6) the methods being employed in erection of the structural steel.

To provide about 5,000,000 cu.ft. of space, the building is 30 stories in height plus a double basement and five penthouse floors. It is 200x117½ ft. in plan, with the long dimension fronting on Ervay St., while the south front is on Commerce St. and the north on Main St. The steel-frame structure will have a granite base with stone face for the first five stories and then brick for the remainder. In addition to offices and quarters for the Mercantile Bank, large office rental areas will be provided. Since the necessary structural steel was ordered early in 1941, with much of it delivered and in place a few months later, it has seemed logical to carry the work to completion at the present time under a B1 preference rating issued last year. Furthermore, the building will aid in reducing the shortage of office space for war agencies in the Dallas area.

Because the first floor could be profitably devoted to stores and shops, the main banking room is placed on the second floor, with up and down escalators and a wide stairway connecting with the street level. This arrangement also avoided having large numbers of pedestrians passing through the bank to save time in going from Main to Commerce St. And, since the banking room was required to have a 61x160-ft. area free of columns and with a clear height of two stories, trusses were required between the fourth and fifth floor levels to support the upper stories.

The trusses decided upon (Fig. 3) are of 61-ft. span and of 14½-ft. depth, with the heaviest weighing 50 tons. The chief design problem resulted from the necessity for providing an 18-ft. wide by 10-ft. high opening through the middle panel. The method followed was to choose the general truss outline most satisfactory from the interference standpoint and then to design the top and bottom chords for full live and dead load over the entire span, with the web members of the center panel designed for full dead load plus live load on only one-half of the span. This latter condition resulted in a 166-kip sheer in the center panel. One of the completed trusses is shown by Fig. 1.

A highly satisfactory method of using thick gussets to join the chords of the big trusses to the supporting columns is also illustrated by Fig. 3, which shows a cross-section of the largest column. The column is 233 sq. in. in cross-section and weighs 794 lb. per lin. ft. It is made up of a 14-in. wide flange, 426-lb. H-section, two 16x2-in. cover plates, and four 8x4x1-in. angles.

The largest columns must carry 32 stories of the building in addition to wind load and one end of the 61-ft. trusses. This results in a dead-plus-

Rhoton Gilbert photo

Fig. 1. One of the 50-ton, 61-ft. span trusses in the Mercantile Bank Building at Dallas. Note the column connection and the cellular steel floor.

live load of 2,343,000 lb., 122,000 lb. of direct wind load and 461,500 ft.-lb. of wind moment. All the columns rest on Austin chalk of 40,000 lb. per sq. ft. strength, and the sub-basement extends to 42 ft. below street level, while the footings for some of the columns extend 8 ft. farther. The billet for the largest column is 56 in. square and 7½ in. thick.

Extremely light floors

Floors that weigh but 25 lb. per sq. ft., including secondary steel beams and the suspended ceilings, also make the building somewhat unusual. The floors consist of a cellular steel deck welded in place and then a 2¼-in. thick light-weight concrete fill using expanded mica as aggregate. Maximum rigidity was obtained by placing the cellular deck, which has cells on 6-in. centers, so that each deck length has two intermediate supports between splices. An advantage of this type of floor is that the cells permit easy distribution of such services as telephone and power.

Bents in both directions are designed to resist wind. Such a design meant that a horizontal truss system had to be employed at the fifth floor level to transfer wind loads from the columns that rest on the heavy 61-ft. span trusses over to the ends of those trusses. This was accomplished by split-beam connections of the type illustrated by Fig. 4.

For air-conditioning of the building, two systems of ducts are employed, with the control rooms on the thirteenth floor. For the one system, which is of the high-velocity type, 6 to 8-in. dia. risers are used at the outside walls with each riser supplying air to two units on each floor. This system is to control change in the wet and dry-bulb temperatures at the windows, the critical point in controlling the building temperature. In general one unit of this system is used below the windows in each outer office. This means that about 900 such units are required for the entire building and that some of the risers deliver air to as many as 28 units.

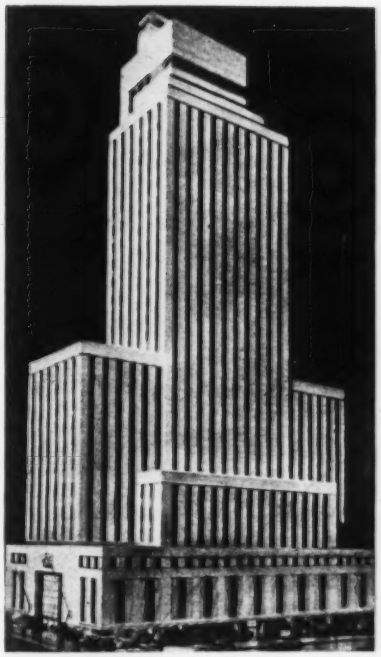


Fig. 2. Building, to be tallest structure in Dallas, is 30 stories in height plus two basements and five penthouse floors.

The second system is a typical duct installation and is for totally fresh air. Its purpose is to air-condition the inner offices that have no outside exposure. One or two ducts per floor are provided for this system.

Two erection derricks

For erection purposes two guy derricks (Fig. 5), one with a 110-ft. mast and 100-ft. boom and one with a 100-ft. mast and 90-ft. boom, are being used. These derricks were located at the quarter points of the 200-ft. length in erecting the first 14 stories and in these positions picked steel direct from trucks on Main St. or Commerce St. When the fourteenth story level was reached one derrick was taken down and the other moved to near the center of the building. Steel was delivered by trucks using the permanent driveway that is to extend through the building from north to south at the rear and raised through temporary openings in the building's framework. Of interest is the fact that 48 percent of the steel required is employed below the fifth floor.

The 61-ft. span trusses were assem-

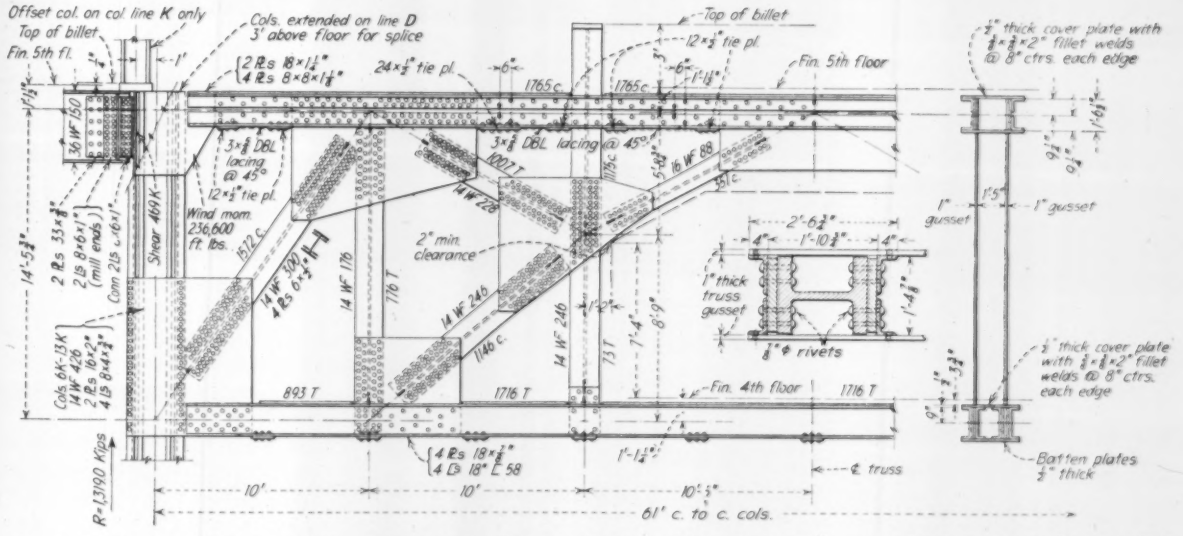
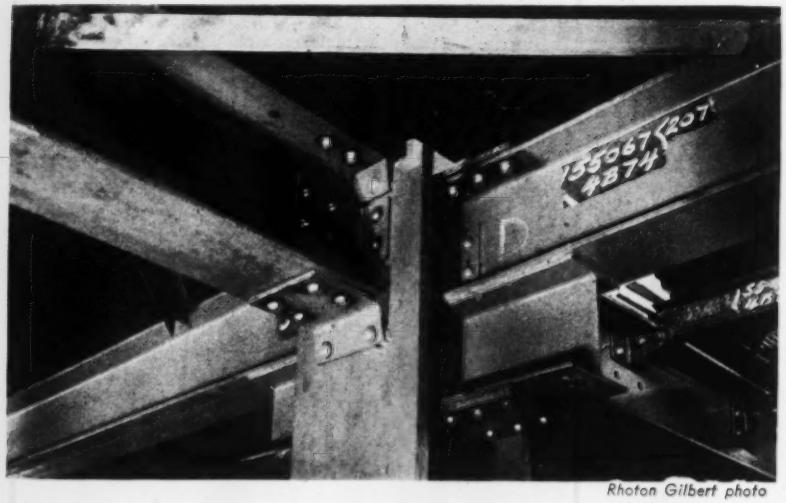
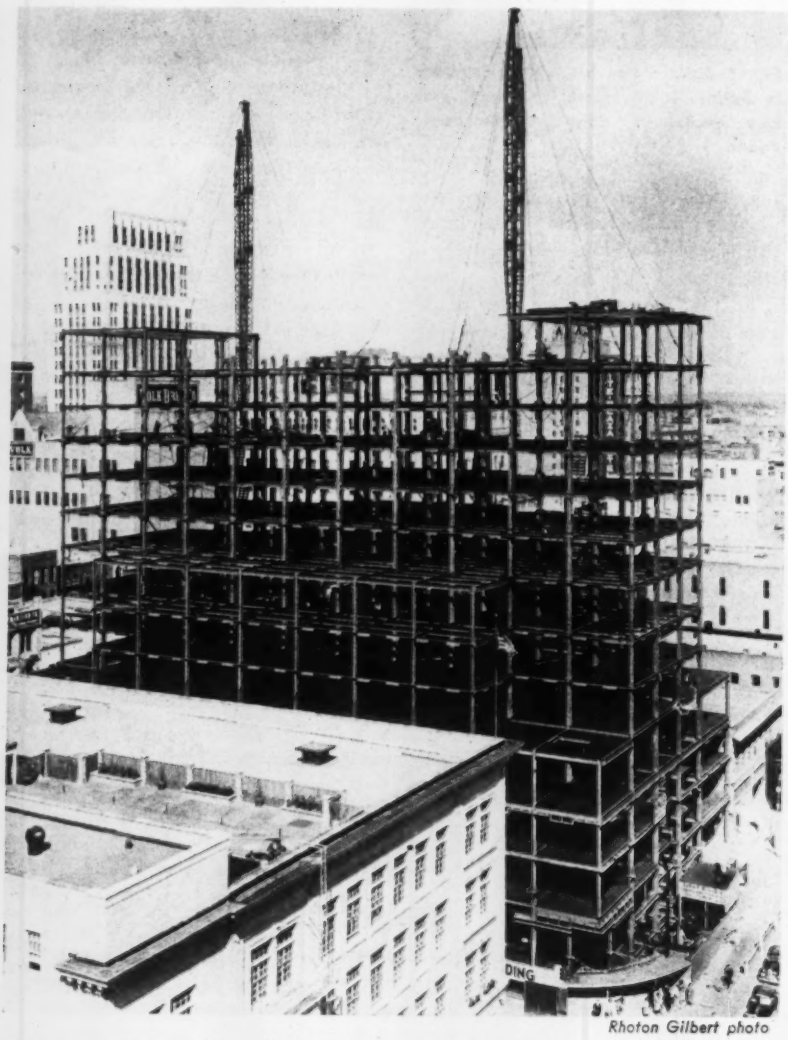


Fig. 3. Details of a 61-ft. span truss, which require 50 tons of steel. These trusses are assembled in place, the heaviest erection piece weighing 16 tons. The method of connecting the trusses to the supporting columns is illustrated at the right. The column section shown, 233 sq.in., is the laregst used.



Rhoton Gilbert photo

Fig. 4. Typical split-beam wind bracing at an interior column. Wind bracing is unusual in that it enables each bent in both directions to take its share of the wind load.



Rhoton Gilbert photo

Fig. 5. For erection of the steel for the lower 14 stories two guy derricks were used, raising steel from trucks at each end of the building. Later, only one derrick, located at the center of the structure, is to raise steel through the interior of the building.

bled in place, the lower chord bein erected, then the intermediate mem bers and then the top chord. Th heaviest member handled was th 16-ton top chord. An 11/16-in. cam ber was provided to offsest the de flection when the trusses receiv their full load.

Seven elevators with a speed o 800 ft. per minute and capacity o 3,500 lb. each will be installed in the shape of a "U" at the center o the building.

The building will have its own boilers, and the tall steel stack required will be supported at every other floor level. Below each supporting floor a 1-in. slip joint will be employed. This stack will be lined with vitrified asbestos.

Whos who on the job

Since steel for the building was ordered in March, 1941, rolling of the steel completed a few months later, and erection well advanced before war was declared, the work will continue during the war. For the structure, which is being built by the Mercantile National Bank, Walter W. Ahlschlager is the architect; R. O. Jameson, structural engineer; Henger Construction Co., builder; Mosher Steel Co., structural steel fabricators; and John Beasly Construction Co., the structural steel erectors. Vilbig Bros. were the foundation contractors. All of the firms are Dallas organizations, except the John Beasly company, which has its home office at Oklahoma City. The building is scheduled for completion early in 1943.

Sewer Rental Charges

Special charges for the use of sewerage systems, under consideration in some war-production communities as a source of revenue to meet demands for increased municipal services, already are made in 185 cities, reports the International City Managers' Association. The high percentage of cities charging sewer rentals lies in the cities above 100,000 population and in those between 10,000 and 25,000.

Basis for the charge in the larger cities usually is the metered water consumption or a percentage of the water bill. Cities between 10,000 and 25,000 population use a wide variety of bases for the charge and frequently employ several bases in combination.

Saving Reinforcing Steel By Rationalizing Safety Factors

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Manager, Structural Bureau
Portland Cement Association, Chicago

***Contents in Brief**—Consideration of means to save steel in reinforced-concrete construction has led to a new design method, which is advanced as being more logical than conventional procedure. It involves increasing unit stresses, but by the indirect procedure of using a reduced dead load for design purposes. In effect it reduces the safety factor for dead load while leaving the live load factor unchanged, an expedient declared to be justified because dead loads are fixed and calculable. The result is a more balanced design as between carrying capacities of slab, beams and girders in a framing layout. A basic advantage of the method is that it requires no changes in building codes nor revision of handbook design data.*

STRUCTURAL ENGINEERS are making an effort to save steel wherever possible, and an important question relates to how this can be done in reinforced-concrete structures. Use of higher unit stresses has been widely discussed as a means of steel conservation, and this article presents what is believed to be an effective and safe design method for securing the advantages of higher stresses through a revision of the safety factor for dead load. The procedure is not only suggested as an emergency measure but as one that is logical for normal times as well as the present.

Many engineers have recognized for a long time that there is something inconsistent in the way in which we proportion our structures for design load and allowable stresses. Present procedure has been used so long and so universally, however, that many designers may have forgotten what is wrong with our design methods.

Consider, for example, a structure with a floor slab framing between reinforced-concrete girders, and assume that the loads per sq.ft. are

Live Load (LL)	= 100
Dead Load (DL), slab alone	= 50
Dead Load (DL), slab and girder	= 200

In present practice we design both slab and girder for $DL + LL$ and a tensile steel stress of 20,000 psi. This is one-half of the yield point stress for intermediate grade bars, which will here be taken as 40,000 psi. It is assumed that a tensile steel stress of 40,000 psi. is equivalent to failure.

In order to get a clearer picture of the safety with which the slab and the girder are designed, compute the load, X, which, if superimposed on the slab, will create a stress of 40,000 psi. The total load at failure is $DL + X$ and must be equal to twice the load $DL + LL$ which creates a stress of 20,000 psi., or we may write

$$\text{For slab: } \frac{40,000}{20,000} = \frac{DL + X}{DL + LL} = \frac{50 + X}{50 + 100}$$

from which $X = 250\ (= 2.5LL)$

$$\text{For girder: } \frac{40,000}{20,000} = \frac{DL + X}{DL + LL} = \frac{200 + X}{200 + 100}$$

from which $X = 400\ (= 4.0LL)$

Under the conditions given, the slab will fail when the superimposed load is 250 lb. per sq.ft., but the girder will not fail until the load is 400 lb. Therefore, the girder has an excess carrying capacity of 150 lb., which cannot be utilized because the slab fails first. It is clear that the girder has been designed with a factor of safety that is excessive and that material has been wasted.

In the example, the dead load on the girder is 200 lb., which is twice the value of the live load. The ratio of dead to live load may be even greater in long span structures carrying light roof loads and in long span bridges. It is especially in structures of this type that we encounter the worst consequences of the inconsistency illustrated in the example just cited.

The situation is not remedied by a flat increase in the allowable stress. An increase of 25 percent during the war has been seriously considered in order to save steel. If we use this particular increase and substitute 25,000 for 20,000 in the above calculations, we obtain

For slab: $X = 190\ (= 1.9LL)$
For girder: $X = 280\ (= 2.8LL)$

The ultimate load-carrying capacities are now 280 lb. and 190 lb., so the girder still has an excess capacity of 90 lb. per sq.ft. which can never be utilized. Even worse, it is now questionable whether the slab is safe enough. The design live load is 100 lb., the ultimate superimposed load for the slab is 190 lb., and many engineers will undoubtedly feel that this 90 lb. difference is not a sufficient margin of safety. By raising the stress from 20,000 to 25,000 we have reduced the safety on both slab and girder, but whereas the girder is safe enough we have cut the safety of the slab to the limit or possibly even beyond it.

It is seen that present practice gives a design which may be said to be out of balance, or inconsistent, since ultimate load-carrying capacities of the different members vary considerably.

Reduced dead load for design

There is a simple solution to the problem that deserves to be given proper recognition. For illustration consider designing the slab and the girder for a load of $0.7DL + LL$ and a tensile steel stress of 20,000 psi. If the load of $DL + X$ creates a stress of 40,000, and $0.7DL + LL$ creates a stress of 20,000, then the assumption of proportionality gives

For slab:

$$\frac{40,000}{20,000} = \frac{DL + X}{0.7DL + LL} = \frac{50 + X}{0.7 \times 50 + 100}$$

or $X = 220 \ (= 2.2LL)$

For girder:

$$\frac{40,000}{20,000} = \frac{DL + X}{0.7DL + LL} = \frac{200 + X}{0.7 \times 200 + 100}$$

or $X = 280 \ (= 2.8LL)$

The ultimate carrying capacity is now 220 lb. for the slab and 280 lb. for the girder, which means that compared with present design the margin of wasted load-carrying capacity has been reduced from 150 to 60 lb., which is certainly an improvement. Compared with the 25,000-lb. design the carrying capacity of the slab has been increased from a superimposed load of $1.9LL$ to $2.2LL$, which is also a step in the right direction. This illustrates what can be accomplished, but it should be noted that the procedure is flexible. By substituting load factors different from 0.7 and 1 we are able to vary the design in such a manner that we can obtain almost any result desired.

We have chosen to illustrate the principle by the use of a load of $0.7DL + LL$. If this load creates a stress of 20,000, a load of $DL + LL$ will create a stress, f_s, which may be computed from the following equation:

$$\frac{f_s}{20,000} = \frac{DL + LL}{0.7DL + LL}$$

from which

$$f_s = 20,000 \frac{DL + LL}{0.7DL + LL} = 20,000 \frac{DL/LL + 1}{0.7DL/LL + 1}$$

Inserting various values for DL/LL gives the following stresses:

DL/LL	0	¼	½	1	2	4	Infinity
f_s for $DL + LL$	20,000	21,300	22,200	23,500	25,000	26,300	28,600
f_s for $0.7DL + LL$	20,000 for all ratios of DL/LL						

This tabulation illustrates what stresses exist under loads of $DL + LL$ in structures designed according to the proposed procedure. The stresses may vary from 20,000 to 28,600. It is as if we had designed for $DL + LL$ and a variable allowable stress. As the dead-to-live-load ratio increases, the allowable stress also increases. The minimum value for $DL/LL = 0$ is the same as the allowable stress we are using at present.

For $DL/LL = 2$ the allowable stress is 25,000.

What we have actually done is to raise the stress or reduce the safety more and more when the dead-to-live-load ratio increases. It is believed that this type of design is a decided improvement. It allows increase in stresses where such increase is justified. It will save a lot of material, including steel, in heavy, long span structures, which are now overdesigned. Furthermore, it is a consistent step to take in any case, even if we do not want also to increase the allowable stresses.

How the new design method works

An illustration of how the new procedure works in an actual design case is presented in the accompanying table which compares it with conventional procedure for the common type of floor framing consisting of girders of 40-ft. span, supporting beams of 25-ft. span which carry a 4-in. slab. All units are in feet and kips.

It is worth noticing in the two procedures that the working stresses are the same. In other words, no change need be made in present codes. Design handbooks and other design data may be used just as they are without any revision. No time will be wasted revising design curves or design procedures. The only new thing the designer has to do is to multiply all dead loads by 0.7. He will actually be designing for $DL + LL$ and a variable stress, but he need not know it nor bother about it because it comes out that way automatically.

From the data in the table it may be noted that the proposed design effects the following reductions over present design practice: Moment in slab, 15 percent; moment in beam, 17 percent; moment in girder, 20 percent; and load on column, 20 percent. Since tensile steel is proportional to bending moment and is designed for 20,000 psi. in both designs, the saving in tensile steel according to the proposed practice is from 15 to 20 percent. But since the column load is also reduced by 20 percent, the saving in reinforcement may be greater than 20 percent assuming that the same concrete section would be used.

Referring to the tabulation which shows that stresses in structures designed according to the new procedure vary from 20,000 to 28,600 under $DL + LL$, it is seen that the new procedure involves increases in stresses from zero up to 43 percent. In other words, the proposed design load of $0.7DL + LL$ has been chosen so that it combines two steps. It allows increased stress and it serves to create a better balanced structural design. As already mentioned, the stress range in the table may be varied to suit individual requirements. This is a question for further investigation.

Some significant considerations

In proportioning a concrete beam we may select a section in which the concrete compressive stress is the maximum now allowed, that is, a section with balanced steel percentage. We may then determine the tensile steel for a stress of, say, 25,000. By this procedure we have saved 20 percent of the steel compared with present design.

In the proposed design practice we are operating with $0.7DL + LL$ and 20,000, which means that *all* stresses, including those in the concrete, have been increased. For that reason the designer is able to reduce the beam depth and therefore may not obtain the maximum potential saving of steel. That is of course possible but not probable. Certainly, every designer knows that deepening a section will reduce the tensile steel, and he ought to take full advantage of it during the war. The rule has been suggested, in connection with the proposed design, that beam depth should be increased by at least 10 percent over that required for balanced steel percentage.

A serious objection may be raised to the proposal of increasing stresses for tensile steel alone, for then there is no provision for saving in compressive bars in beams, or for shear reinforcement, or for columns and footings. In other words, we start out with a design that is far from well balanced in regard to ultimate carrying capacity.

We then make matters still worse by reducing the safety factor

COMPARISON OF PROPOSED DESIGN PROCEDURE USING PARTIAL DEAD LOAD, WITH PRESENT DESIGN PRACTICE

Proposed Design		Present Design	
Slab 4 in., clear span = 12.5 ft., mom. coeff. = $\frac{1}{12}$			
Weight of slab; 0.7×0.050	= 0.035	Weight of slab	= 0.050
Live load	= 0.050	Live load	= 0.050
	0.085		0.100
Neg. mom. = $\frac{1}{12} \times 0.085 \times 12.5^2$	= 1.11	Neg. mom. = $\frac{1}{12} \times 0.100 \times 12.5^2$	= 1.30
Reaction = $0.085 \times 13.33/2$	= 0.566	Reaction = $0.100 \times 13.33/2$	= 0.667
Beam $11\frac{1}{2} \times 22$ in., clear span = 24.0 ft., mom. coeff. = $\frac{1}{12}$			
From slab; 0.566×2	= 1.132	From slab; 0.667×2	= 1.334
Beam web; $0.7 \times \frac{11.5 \times 18}{144} \times 0.15$	= 0.151	Beam web; $\frac{11\frac{1}{2} \times 18}{144} \times 0.15$	= 0.216
	1.283		1.550
Neg. mom. = $\frac{1}{12} \times 1.283 \times 24.0^2$	= 61.6	Neg. mom. = $\frac{1}{12} \times 1.550 \times 24.0^2$	= 74.4
Reaction = $1.283 \times 25.0/2$	= 16.0	Reaction = $1.550 \times 25.0/2$	= 19.4
Girder 15×48 in., span = 40.0 ft., mom. coeff. = $\frac{1}{9}$ and $\frac{1}{12}$			
From beams, concentrated; 16.0×2	= 32.0	From beams, concentrated; 19.4×2	= 38.8
Girder web; $0.7 \times \frac{15 \times 44}{144} \times 0.15$	= 0.48	Girder web; $\frac{15 \times 44}{144} \times 0.15$	= 0.68
Neg. mom. = $\frac{1}{9} \times (2 \times 32.0) \times 40 +$		Neg. mom. = $\frac{1}{9} (2 \times 38.8) \times 40 +$	
$\frac{1}{12} \times 0.48 \times 40^2$	= 348	$\frac{1}{12} \times 0.68 \times 40^2$	= 436
Reaction = $32.0 + 0.48 \times 40/2$	= 41.6	Reaction = $38.8 + 0.68 \times 40/2$	= 52.6
Column 18 × 18 in.			
From beams; 2×16.0	= 32.0	From beams; 2×19.4	= 38.8
From girders; 2×41.6	= 83.2	From girders; 2×52.6	= 105.2
Weight of Col.; $0.7 \frac{18 \times 18}{144} \times 0.15 \times 12$	= 2.8	Weight of Col.; $\frac{18 \times 18}{144} \times 0.15$	= 3.4
	118.0		147.4

for the tensile steel only, but not for shear and compressive reinforcement nor for columns or footings. A design that is out of balance to begin with is thrown still more out of balance. It seems much more reasonable to begin with factors of safety and on that basis to work out a consistent type of design load.

It may seem that the proposed procedure allows us to design for 30 percent less than the actual dead load. Actually this is not correct. Operating as we do here with an ultimate stress of 40,000 and a working stress of 20,000, the nominal factors of safety are *twice* the value of the load factors. That is, if we design for $DL + LL$ the safety factor is 2.0 for dead load and 2.0 for live load. For comparison, in the proposed design with the load of $0.7DL + LL$, the nominal safety factor is 1.4 for dead load and 2.0 for live load. Therefore the factor of safety for dead load has been reduced by 30 percent. The amount of dead load allowed on the structure at failure is $1.4DL$ or 40 percent in excess of the actual dead load. We have not taken off any load, we have reduced the safety factor.

The question finally comes up: Is it desirable to have the same safety factor for dead as for live load? The two types of load are essentially different. Dead load is a much more certain calculable quantity. It does not move or change; it creates neither impact nor vibration. It seems reasonable that the factor of safety should be smaller for dead than for live load. This is the crux of the whole matter. The fact is that if we want to increase allowable stresses we must of course reduce one or both of the safety factors. How to reduce them is the question. All we do in the new proposed design is to keep the factor for live load the same as before but reduce the safety factor for dead load by 30 percent.

Tax-Reverted Land for City Expansion

ST. PAUL'S long-range planning program to expand public services through use of tax-reverted land is providing the city this year with additional playgrounds and recreation fields, city-park additions, and sites for a branch public library and a training ground for firemen. The program was outlined in 1938 by the city planning board in cooperation with other municipal departments, and was put into effect this year under a 1941 state law authorizing cities to acquire tax-forfeited land without compensation on condition it be used exclusively for public purposes.

In following the 1938 outline, reports the American Society of Planning Officials, St. Paul under the new state law took over 337 parcels of land totaling 64 acres and valued at $120,000. About a third of this land has been put to use as follows:

The department of parks, playgrounds and public buildings is building public playgrounds and recreation centers, particularly in districts lacking these facilities, and plans to expand two city parks by utilizing several parcels of tax-reverted land.

The department of education is using several lots as a site for a branch public library in a district heretofore served inadequately by a portable library, and has provided a high school with an athletic field.

The department of public safety is utilizing tax-forfeited property acquired near its administration building for construction of a drill tower to be used to train members of the fire department in the use of ladders, fire fighting, and rescue work.

The department of public works is using lands it acquired for additional storage space at the department's asphalt plant, where storage facilities were overcrowded.

In drawing up the tax-reverted land-use program, a map for the city planning board was prepared, showing locations of such lands. Then the planning board, in cooperation with other departments of the city government, made a list of lands to be withheld from sale because they would be more valuable for public use than private use. The land was withheld from sale and, under the 1941 law, the program was placed in operation.

Fig. 1. General view of Bluff Creek Dam construction showing methods of placing the 4,200,000 cu.yd. of fill required.

Dual Water Supply for Oklahoma City

***Contents in Brief**—Underway at Oklahoma City is a project that will double the capacity of the present water treatment plant and, in addition, make available a new 40-mgd. supply. The new supply works include a long earth dam, some five and one-half miles of canal, a 3,500-ft. siphon and a new treatment and pumping plant. By doing the earthwork by force account, an $800,000 saving is expected. An unusual but successful treatment method used in the old treatment plant will be incorporated in the new works.*

LARGE FORCE ACCOUNT construction projects ordinarily are not considered as economical as general contract work, especially where three 8-hr. shifts are employed seven days a week. However, an $800,000 saving is expected by following the force account method for nearly one-third of a $6,900,000 improvement of Oklahoma City's existing waterworks and construction of a new 40-mgd. dual supply. Major construction items for the latter work (Fig. 2) are: (1) a 4-mi. earth dam ten miles northwest of the city on Bluff Creek, a tributary of the Cimarron River; (2) a 5½-mi. canal and a 3,500-ft. reinforced-concrete box siphon to carry North Canadian River water to the new Bluff Creek Reservoir; (3) a new treatment and pumping plant; and (4) 5 mi. of 48-in. dia., cast iron main to connect Bluff Creek reservoir with the city's existing distribution system.

The force account work, totaling about $2,000,000, is mainly the earth and riprap work for the dam, canal and siphon. Force account methods were chosen only after advertising the work for general contract had failed to obtain offers within the allotted cost range. When bids were opened on July 29, 1941 for all construction work pertaining to Bluff Creek Dam, the canal, and the siphon, the only bid received was $836,000 higher than the engineer's estimate of $2,950,000. New bids were advertised for Aug. 12, 1941 and with this opening the only bid proved to be that from the original bidder, who submitted his initial proposal. With water demands increasing rapidly, because of war industries in the Oklahoma City area, it was decided to do all earthwork pertaining to the dam, canal, and siphon by force account and with rented equipment. A similar procedure is to be followed for the riprap work, a $700,000 job, but the structural work was advertised for general contract.

From expenditures to date the earthwork is expected to cost $800,000 less than the $2,063,000 bid received for this operation. The force account method is considered more economical than doing the work by general contract for several reasons. These include: (1) only one bid was received for the earthwork and this was probably high to offset possible unfavorable war developments; (2) the city needs no bonding, as would a general contractor; (3) a municipality need not pay the Oklahoma state sales tax, while a private concern doing municipal work must; (4) no social security tax need be paid by the city, as is the case with a general contractor; (5) contractor must pay income tax on profits, but the municipality would not need to allow for this; and (6) by careful supervision the city's engineers are able to obtain the maximum benefit from all expenditures.

Use of North Canadian River water and the improvements previously outlined were considered the best means to augment the supply because: (1) capacity of present treatment facilities could be doubled at a cost of $250,000; (2) with sufficient storage, the North Canadian flow is ample to meet all needs; (3) an excellent soft water is obtainable, provided storage occurs at the proper time; (4) a large saving in treatment chemicals is possible by storing water at the most advantageous periods; and (5) the project proved most economical when compared to the other schemes.

Other supplies studied included the Illinois River, the South Canadian River, Mustang Creek, and deep and shallow walls. In addition, investigations were made as to the feasibility of improving the present system by

extending Overholser Dam to provide greater storage, dredging Lake Overholser to add storage, and obtaining channel storage in the North Canadian River by joining the federal government on the Canton Dam project.

Machinery rented for earthwork

For doing the earthwork by force account $500,000 worth of machinery was rented at a price of 11½c. per cu.yd. of earth placed. In the same way a maintenance contract was awarded at 3½c. per cu.yd. The 110-ft. high dam will require 4,200,000 cu.yd. of fill to make available 75,000 acre-ft. of storage in a reservoir covering 2,500 acres. A splendid red clay is obtainable from borrow pits in the reservoir area and from the excavation for the canal and siphon. The earth-moving operations continue seven days a week with three 8-hr. shifts employed.

For construction of the core the top soil is stripped off and wasted and then a centerline trench of 12-ft. bottom width is carried down to bed rock, which is as much as 40 ft. below the surface. For the core fill, the previously excavated red clay is used and it is placed in 6-in. thick layers and compacted with sheepsfoot rollers. This results in a material of 110 lb. per cu.ft. dry weight. Above the trench the red clay for the entire width of the dam is placed in much the same way.

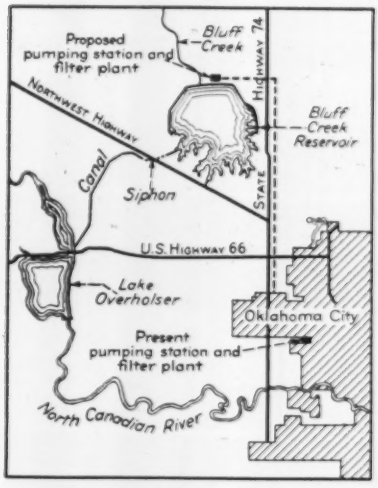

Fig. 2. New 40-mgd. water supply will be obtained from the North Canadian River. It will require 5½ mi. of canal and a 3,500-ft. siphon extending from near Lake Overholser to a 25-billion gallon reservoir to be created by a 4-mi. long earthen dam on Bluff Creek. Near the reservoir a new treatment and pumping plant will be constructed, and a 48-in. dia. pipeline will connect this plant with the city's existing distribution system.

For the 1,604,366 cu.yd. placed in the dam before April 1 the cost has been 29.51c. per cu.yd. This includes all expenditures in setting up repair shops at the site, overhead, and common, skilled and supervisory labor. It is broken down in cents per cubic yard as follows: Rental of equipment, 11.5; equipment maintenance, 3.5; fuel and oil for machinery, 1.9; salaries, 1.33; skilled labor, 8.02; unskilled labor, 1.24; all other costs, 2.02. The 29.51c. total is 20.49c. cheaper to date than the bid prices of 50c. per cu.yd., according to the resident engineer.

Major pieces of earth-moving equipment employed on the dam included: Three sheepsfoot rollers in tandem; two 2½-yd. combination dragline and dipper shovels; fourteen 14-yd. dump wagons; twenty crawler tractors; eight 10-yd. scrapers; two 48-in. elevating graders; two 2½-yd. diesel shovels; and four 12-ft. patrol graders.

Excavation for the siphon and canal is also part of the force account work. The canal (Fig. 2) starts on the east bank of the North Canadian River just above the spillway diverting water into Lake Overholser and flow into the waterway will be controlled by a multiple concrete box equipped with five 8x8-ft. sluice gates. Below the intake the next 5 miles consists of an open canal varying in bottom width from 12 to 100 ft. and requiring cuts as great as 57 ft. About two-thirds of this work, which is just beginning, will require the use of well points or some other type of underdrains, but for the remainder little trouble is expected. Short lengths of the canal will be

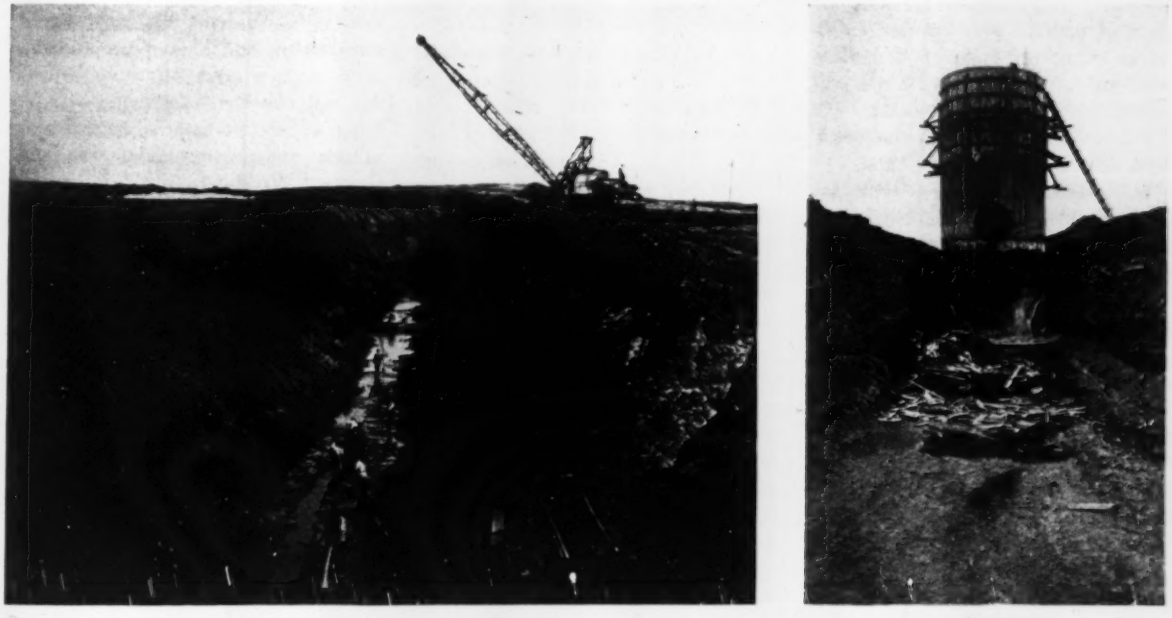

Fig. 3. Along the centerline of the Bluff Creek Dam, which will be a rolled earthfill of 110 ft. maximum height, excavation for a trench of 12-ft. bottom width is carried to rock. Trench is then filled with red clay placed in 6-in. layers and compacted with sheepsfoot rollers in the same manner as the fill for the upper part of the dam. The reinforced-concrete outlet tower, which has gate openings at different levels, is shown at the right.

Fig. 4. Construction required to deliver North Canadian River water to Bluff Creek Reservoir includes a 3,500 ft. long siphon consisting of a double 7x7-ft. reinforced concrete box. Here the siphon is being constructed across one of two small reinforced-concrete culverts.

lined with 4-in. reinforced-concrete slabs underlain by a 6-in. layer of gravel drained by a 15-in. dia. tile at the lowest point. The major part of the canal requires no lining.

At the east end of the canal the waterway is to continue for 3,500 ft. as reinforced-concrete siphon made up of two 7x7-ft. boxes. The siphon, which is necessary to carry the supply under the divided, dual-lane Northwest Highway, is being built in 100-ft. sections in an open trench and then covered with the earth excavated for its construction. This covering is to reduce expansion changes of the sections to a minimum. In passing through the siphon the water will utilize a 35-ft. head with the maximum flow estimated at 1,500 cfs.

To connect the siphon with the Bluff Creek reservoir about 2,500 ft. of open canal will be needed; no lining will be used. The canal will be 100 ft. wide at the siphon end, thus permitting it to act as a stilling basin to prevent scour.

Treatment plant details

Construction of the treatment and pumping plant just north of the reservoir has not been started, but plans for this structure are complete except for revisions to reduce the use of critical materials. This project is estimated to cost $1,300,000 and will provide treatment similar to the return-sludge process at the existing plant.

The old plant, which treats North Canadian River water stored in Lake Overholser, is so overloaded that countless schemes have been tried to increase production. Best results have been achieved by returning lime sludge equivalent to 5 percent of the flow of water through the plant. Another development at the old plant, for which Superintendent L. H. Scott is largely responsible, is a temperature control so that the lime feeding is regulated by the temperature of the lime water in the slaker. This makes possible the use of crushed lime just as it comes from local crushers and results in a yearly saving of between $5,000 and $10,000.

Present step-by-step treatment at the existing plant, and that to be employed for the new supply is: (1) prechlorination of about 20 min.; (2) addition of alum and lime after a four-minute flash mix with the return sludge; (3) detention of the water for 30 min. in the flocculators; (4) storage of the water for one hour in the clarifiers; and (5) filtration of the supply by anthracite coal filters at the rate of 4 gal. per sq.ft. per minute. Experience shows the method very satisfactory for three reasons, namely, reduced chemical demands, better water quality, and lower cost per gallon of treated water.

Improvements now in progress at the existing plant include construction of two duplicate 16-mgd. flash mixers, two flocculators, a 100-ft. dia. clarifier, and eight new rate controllers. The new construction will increase to 32 mgd. the capacity of the existing plant, which is designed for 16 mgd. but on occasion has treated 24 mgd. This $228,000 job entails no unusual construction features.

Distribution improvements

Another major part of the waterworks improvement plan is the extensive pipeline construction. In all, over 26 mi. of mains, varying in size from 6 to 48 in., are required for the new supply and improvement of the existing distribution system. To connect the new treatment plant and the existing distribution system a 4-in. dia. cast iron line 5 miles long is being built. In addition, several miles of 48-in. pipe and 3,000 ft. of 42-in. pipe are being laid to improve the distribution network.

One of the features of this work is that the larger mains are designed for the earth and other loads to be supported. Thus, the thickness of the 48-in. pipe varies from 0.96 to 1.36 in., the 42-in. from 0.88 to 1.20 in., and the 36-in. from 0.8 to 0.9 in., and the 30-in. size from 0.72 to 0.9 in., while the smaller sizes are all of standard thicknesses. Pipeline construction is being carried out by four firms in accordance with a $1,700,000 joint contract awarded Aug. 2, 1941.

Personnel in charge

The entire development, financed by a $6,900,000 bond issue, is supervised by H. E. Bailey, city manager, Stoner K. McLelland, construction coordinator, and M. B. Cunningham, chief engineer and superintendent of the waterworks department. V. V. Long, Oklahoma City, is general consultant and design engineer, and Porter J. Preston, Denver, is special consultant on the dam work. S. W. Freeze of Freeze & Nichols, Fort Worth, Tex., is special consultant on the pipeline construction, which is being done jointly by Sherman Machinery & Iron Co., B & M Construction Co., Earl W. Baker Construction Co., and Swatek & Co., all of Oklahoma City.

Stephen Pennington, Oklahoma City, is improving the existing filter plant and Gray & Gravelle, Oklahoma City, are doing the concrete work for the dam, canal and siphon. The earth-moving equipment is being rented from the Cole, Carley & Hudkins firm at Omaha, Neb. The new supply is to go into service early in 1943.

Fig. 1. Lighting of streets should be maintained at highest efficiency up to the time when attack is imminent.

Blackout of Street Lighting

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***Contents in Brief**—Efficient functioning of the nation's war effort requires that blackouts of street lighting be limited to the period when attack is imminent, because darkened streets slow up transportation of war materials and men, increase accidents and lower morale. Systems of control of street lighting that fit into such a program are outlined, and essential elements of those systems are given.*

BASIC to the development of systems to blackout street lighting during an emergency is recognition of the need for limiting the blackouts to the shortest period that will provide the desired protection from air attack. Except where the danger of attack is immediate, the most efficient functioning of the whole war effort requires not less, but more lighting on most of our streets and highways in order to safeguard and facilitate the movement of traffic.

This concept will become more important as the war effort expands, since streets and highways are really part of the assembly line in our war effort, the large industrial plants being assembly plants for a multitude of parts coming from small subcontracting companies. Trucks handling these parts travel great distances and must be able to travel at night with the minimum of delay and interference.

It also is necessary to recognize that protection from aerial attack afforded by blackout of outdoor lighting is inevitably accompanied by very considerable disadvantages to the public. From experience abroad, a depression of civilian morale and efficiency is to be expected, as is a sharp increase in traffic accidents and property destruction. The reason, of course, is that moonlight or starlight and such artificial illumination as can be permitted under blackout restrictions provides such low visibility that anything approaching normal traffic movement is impossible.

It is necessary, therefore, to proceed on the basis that normal lighting will be continued until the blackout actually is called for. Thus, the time factor becomes a basic consideration in arriving at the best method of control.

Remote control most advantageous

To avoid a disruption of traffic movements and war production that may be far more serious than the damage from a bomb attack, it should be expected that there will be relatively little advance warning. This means that control methods be established that permit relatively few authorized persons to blackout street lighting, preferably from the point where they are normally working, or posted. That is to say, remote control from an attended utility station, or from civilian defense headquarters, is much to be preferred over any system requiring the services of hundreds of individuals. Such a system may well be justified as a means for preventing loss and delay to essential operations due to over-zealous citizens who cannot wait for a turnoff by authorized persons and take the blackout of street lights into their own hands.

Still another basic consideration is the matter of dependability of normal operation. Quite properly, much effort has been put into making remote-control systems "fail safe," to the end that lighting will be turned on automatically if something should cause the control power or apparatus to fail. Many utilities have decentralized their lighting control with automatic time switches for each circuit or light. It now becomes apparent that an es-

sential feature of outdoor lighting control during the war is automatic turnoff of the lights in the event that the normal control method becomes inoperative for any reason. Naturally, an effort will be made to reduce accidental outages to a minimum, but the public will have to be prepared to accept such outages as are not preventable under emergency conditions.

Blackout requirements

The acuteness of vision of an aerial observer whose eyes are adapted to darkness can be illustrated by a recent report that, at a height of 5,000 ft., the glow of instrument-panel lighting was sufficient to enable an observer to pick out the open top cars on a highway in the vicinity of Washington, D. C. Such normally insignificant lighting as the glow of a cigarette, the flare of a match, the upward directed beam of a flashlight, become matters of great concern in case of air attack. It may be argued that the visibility of such a light source does not reveal anything of importance to the aerial observer; but it is obvious that a careless display of a large number of such light sources may void the protective nature of the blackout. Hence their control cannot be left to the discretion of the private citizen. It is necessary to insist on the blackout being sufficiently complete that any artificial illumination present will not reveal a pattern that is intelligible to a hostile aerial observer.

As applied to street lighting, this means that pavement illumination must be reduced to the order of starlight, or about 1/100 of full moonlight, according to information obtained from abroad and supplemented by certain tests in this country. In terms of practical light distribution, it means that there must be no visible light at or above horizontal, that the maximum candlepower value at about 10 deg. below horizontal can be only about 1 or 2 candlepower; that the average pavement illumination should not exceed about 0.0003 foot-candles, the maximum not more than 0.0006 foot-candles.

As regards the color of light, Messrs. W. S. Everett and Kirk M. Reid, in an article entiled "Visual Aids To Traffic Movement Under Blackout" published in *Illuminating Engineering*, December, 1941, report that, contrary to popular notion, reddish light serves best to facilitate ground activities and is at the same time least likely to be detected from the air. They feel that the use of white light for headlamps and street illumination may well be warranted in many situations and that whatever departure there is from white should be in the direction of reddish rather than bluish light.

Relation to ordinary lighting

The modern luminaire for traffic safety lighting, such as the G-E Novalux Form 79R, produces about 3,500 candlepower at 15 deg. below horizontal with a 300-watt or 6,000-lumen lamp—about 1,500 times the amount that probably is permissible in a blackout. When properly used, according to the I.E.S. Code of Street Lighting, this type of lamp produces an average illumination of about 0.66 foot-candles on a medium traffic artery—about 2,200 times the average illumination contemplated for blackout lighting systems. Its glass refractor globe, while contributing much to the efficiency and light control as well as to the maintenance of high efficiency throughout life, forms a secondary light source visible for a considerable distance. The normal performance of such a luminaire is so far greater than what is permissible during a blackout that there is no apparent possibility of meeting the requirements for both lighting and blackout lighting in the one unit. Yet the illumination normally provided by the Form 79R is judged none too much for the night-time traffic on the streets where it is normally used.

Fig. 2. Switches to be operated by special air-raid wardens' keys should be up out of reach of children.

The frequently encountered 600-lumen and 1,000-lumen series lamps (which no one has ever accused of providing safety lighting for any appreciable volume of night traffic) produce about 60 and 100 candlepower respectively, at or near the horizontal, and pavement illumination in the vicinity of the luminaire far in excess of what is permissible in blackouts; and these results are generally considered to be about the lowest form of electric street lighting worth spending money for.

Supplementary blackout lighting

From this it may be inferred that halfway measures involving the turnoff of certain street lights or the dimming of street lights can be expected to produce the disadvantages of the blackout without actually producing the protection expected. Therefore, it would be good engineering to continue to utilize existing lighting systems and improve upon them where necessary for public safety, subject to complete shutdown by authorized persons in event of air-raid warning. Then, for those locations where a blackout lighting system would be useful, a properly designed supplementary system should be installed.

One might well wonder if such blackout lighting systems would be worthwhile in the face of the severe restrictions of volume and control. British cities have found them indispensable; and we will need them too—if, when, or where air raids come so often and last so long that traffic must be maintained anyway. A properly designed system helps tremendously to eliminate the uncertainty and confusion of blind groping on moonless nights. One can see surprisingly well with this little assistance after the eyes become dark-adapted—but by no means well enough to proceed at the normal pace, either on foot or in a blacked-out car, as accident records prove.

The War Department will undoubtedly designate those areas of the country where blackout methods must be provided. The Office of Civilian Defense is expected presently to issue instructions prescribing the

limits of illumination and light distribution permissible from luminaires to be operated during blackout. In the meantime, it would be doubtful wisdom to curtail, dim, or convert any existing street lighting in the name of air-raid protection, or to install any blackout lighting system which might not meet requirements later.

However, it is quite proper for utility engineers to be considering at this time methods for turning off outdoor lighting; for such will undoubtedly be required. For many installations, this is a serious problem, involving a good deal of money and material. However, a great deal besides compliance with blackout regulations hinges upon its successful solution: (a) safety of users of the streets when not actually being raided by hostile aircraft, (b) preservation of civilian morale, (c) continued return on the investment in lighting equipment, (d) retention of the gains made in bringing street lighting up-to-date, in keeping with the needs of present-day traffic. The problem therefore warrants careful consideration.

Types of lighting circuits

Any discussion of means for blacking out street lighting must necessarily presuppose familiarity with the electrical circuits by which such lighting is operated. A basic distinction is between series and multiple systems. The series system provides for lamps to be operated in series in a loop circuit, with a dielectric film cutout shunted across each lamp to restore circuit continuity in event of filament burnout, and with an automatic regulating transformer to preserve constant-current in the circuit. The multiple system, on the other hand, involves the connection of lamps individually to a pair of wires supplying substantially constant voltage (usually 120 volts or thereabouts). In many cases this power supply also energizes other lighting or appliances or motors, so that control switches are needed on each street lamp (or small group of street lamps). This article deals essentially with means for interrupting power supply to the lamps, by various means as described in the following paragraphs.

Control by air wardens

In many cities, weatherproof key-operated switches have been connected into the series control circuits of constant-current transformers so that air-raid wardens can turn off the lights. This type of blackout control is quickly and inexpensively installed and has met the practical requirements in cities where it has been used for practice blackouts.

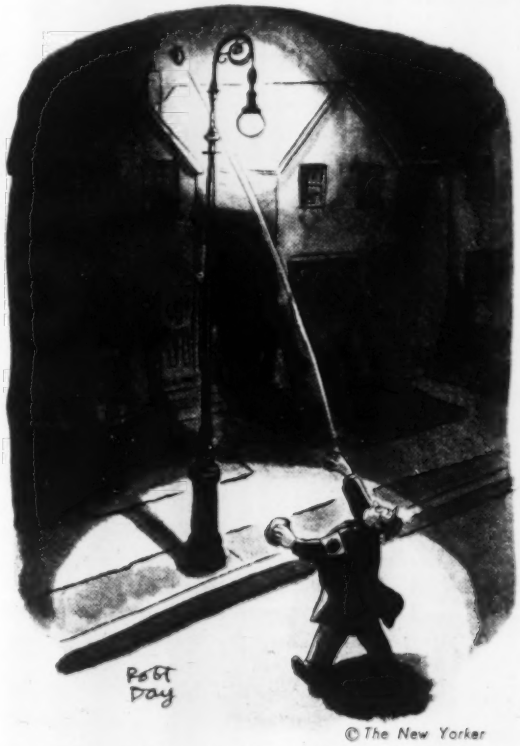

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Fig. 3. The way not to blackout lights.

The switch is mounted about 6 ft. high on the pole below the constant-current transformer, and is connected in series with the time switch or photo-electric relay. The switch should, of course, be weatherproof and operated only by a suitable key. Often, utility men will be able to mount ordinary indoor snap switches or toggle switches in weatherproof housings—such as conduit fittings, meter boxes or plain wooden cabinets—and have them suitably padlocked or arranged for operation by means of a "key" in the form of a simple hook or fork that can be inserted through an opening in the housing. The device should not be so simple and obvious as to encourage operation by any inquisitive youngster.

In addition to providing a sufficient number of keys so that each person authorized to turn off the light shall have one, the public service company should furnish civilian defense headquarters with information as to the location and method of operating these switches. One attractive method devised by engineers of an eastern utility consisted of supplying maps of the city and environs that were subdivided by police precincts; each map section showed numbered locations of the control switches. On the same sheet, the control stations were listed and beside each number was given the exact location of the station, whether it was in the front or in the rear of the property at that location, and what street to look at to see that the lights were out. In addition, each warden was supplied with a printed and illustrated instruction showing how to turn off the lights.

An essential part of this scheme is that the air-raid warden is to be held strictly responsible for the safekeeping of his key and should clearly understand that it is unlawful for him to operate the street lights at any time other than when blackout is signalled.

Some engineers have expressed concern as to whether street lights could thus be switched off quickly enough to meet OCD regulations. Obviously, if the local defense organization has a sufficient number of responsible and properly instructed wardens, the city's street lighting can be blacked-out very quickly by relatively few of them. One circuit of the series type lights a good many blocks. The control of "multiple" street lighting by this method may, however, be "a horse of another color." It calls for more elaborate equipment.

Remote control of series circuits

The control methods most easily adapted to series lighting systems are:

1. Pilot wire and relays
2. Cascade control

The pilot-wire-and-relay system involves one or several low voltage circuits emanating from the control

point, to which are connected suitable relays to actuate the coils of the oil-switch controllers for the constant-current transformers. The relays are almost always necessary if many transformers are to be controlled. Circuit voltage will normally be 120 volts and the circuit should not be so long as to produce excessive voltage drop at the last relay. On very long circuits, it is possible to reenergize from a nearby secondary by cascading with another relay. A standard multiple street-lighting remote-control switch makes a satisfactory relay for this service.

A single-conductor pilot circuit is possible if it is easy to get good grounds at the relay locations. However, for most construction, two-wire circuits seem better, with suitable transpositions on overhead circuits to minimize induction. Normally open relays are best for blackout control. In this system we must consider that an actual bomb attack may knock down portions of the pilot circuit; therefore, normally open relays must be used so that the failure of control power will cause the lighting to be extinguished.

Cascade control involves connecting the operating coil of the oil-switch controller (or a suitable relay) into an adjacent circuit which is subject to manual control (Fig. 4). As the manually controlled circuit is turned on, it automatically turns on the next circuit—a process that can be carried on in as many stages as desired. Ordinarily this system is not highly regarded by operating engineers because of the vulnerability to circuit outages; failures of one series circuit will turn off all circuits cascaded from it. Therefore, this type of control should be used only if the series circuits are or can be put in excellent electrical and mechanical condition.

Oil-switch controllers and series-circuit protective relays, can be changed over to cascade operation but it involves expense and valuable time. One simple device for avoiding the change of oil switch and protector is the substitution of a suitable series-multiple relay for the time switch or photoelectric relay normally used. One such device consists of a relay of such design that it may safely be operated at 6.6 amperes constant current, supplied by an attached Type IL insulating transformer which will provide adequate insulation from the high voltage of the series circuit. This device serves to turn on the local multiple-control power when the adjacent street lighting circuit is energized. (Fig. 5.) The unit can be bought for about $25; which will usually be less than the changeover cost of old style equipment.

It is not practical to use series insulating transformers of the type designed to operate multiple incandescent lamps for the purpose of directly operating these oil-switch controllers. Such transformers produce rated multiple voltage only with incandescent lamp or resistance load and will not answer the requirements of the oil-switch coil. A proper conversion unit could be built, but only at a cost greater than that of the above mentioned series-multiple relay.

In cases where normally closed oil-switch controllers are being used, these should be changed to the normally open type, for which purpose parts can be purchased at relatively little cost.

Opening the series circuit for blackout control is a dangerous and ill-advised practice. This has been suggested in several quarters, the idea being that a switch could be inserted in the series lighting circuit where it passes an air-raid warden's post to enable him to extinguish the street lights simply by opening the switch. It is certainly a simple and direct method, but it has several important disadvantages:

1. Sustained over-voltage may break down cable insulation and possible strain the coil insulation of old constant-current transformers.
2. The line is still "hot" and will be dangerous to passersby if a pole is knocked down.
3. Lights may come on again if the circuit is re-established by lines being grounded on both sides of the open switch.
4. Transformers of the non-automatic-starting type may be seriously damaged if the circuit is closed without a station operator having latched the coils apart.

These can be overcome by installing an open-circuit protective relay at the constant-current transformer location, to shut off the power supply when the series circuit is opened. However, this will have to be reset by a utility employee to restore the lighting after the blackout, so that the method still has objectionable features. Preferably, the control should remain in the hands of utility employees and should be used regularly so that the operator is fully familiar with what is required.

Remote control of multiple lighting

The remote methods most readily adapted for control of large scale multiple street lighting consist of:

A. Carrier-current control

B. Pilot wires and relay

All things considered, the carrier current system is probably the easiest of all control systems to apply and use. The noteworthy feature about carrier-current control schemes is that no additional circuit wiring is required. A compact and relatively inexpensive receiver is installed in each switching point; and a high-frequency generator is coupled to the feeder with capacitors or transformers. Impulses of different lengths and spacings will perform at least nine different functions. The whole operation is capable of push button control.

The disadvantage of this system is its first cost if it must be justified for only one use instead of the nine or more services it makes available. This will be most serious on network systems, and least on radial feeder systems which permit application of control energy to one feeder at a time.

As an alternative to installing and maintaining any appreciable lengths of pilot circuits, the carrier system may be attractive from the standpoints of overall cost and labor in-

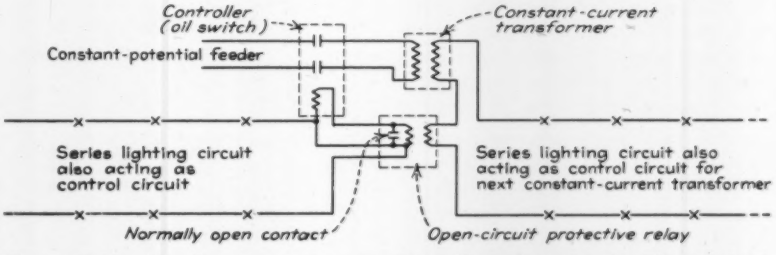

Controller (oil switch)
Constant-current transformer
Constant-potential feeder
Series lighting circuit also acting as control circuit
Series lighting circuit also acting as control circuit for next constant-current transformer
Normally open contact
Open-circuit protective relay

Fig. 4. Schematic diagram of the cascade method of controlling the constant-current transformers of street lighting systems in which the oil switch is connected directly into the control series circuit.

volved in installation. Engineers who have studied these systems say that on a radial feeder system, carrier may be the most economical of all control systems for multiple lighting involving 2,000 or more individual street lamps, without considering the economical value of the other functions it is capable of performing. Under present conditions some of these other functions are of considerable importance in themselves.

The use of pilot circuits and relays is a simple direct method, which unfortunately takes a lot of wire. The same methods and precautions should be taken as in series circuits similarly controlled.

Control of auxiliary lighting

In a lighting system consisting generally of series circuits, one frequently encounters a few multiple lamps lighting a bridge, an alley, a sign or a safety zone. For blackout, such lighting might well be controlled from the nearest series lighting circuit. If a control method is adopted whereby the series circuit simply supplies the control but not the power to this multiple lighting, then no change in the multiple lighting equipment or wiring will be needed.

Another possibility consists of a multiple street-lighting remote-control switch operated from a conventional single-lamp insulating transformer. For example, a 30-ampere street-lighting remote-control switch will operate satisfactorily on constant current when provided with a 6.6-ampere operating coil, and thus can be operated from any standard Type IL transformer with 6.6-ampere secondary. One such transformer could operate several of these switches, if desired. With this particular switch, the transformer requirements can be calculated by allowing 4.5 volts per switch, plus line drop at 6.6 amperes. Select a transformer rated to supply at least that much voltage to a 6.6 ampere series lamp.

An important feature of this scheme is the safety provided; the Type IL transformer is amply insulated for use on circuits up to 10,500 volts. Also, it enables the user to mount the control switch where convenient and connect to the transformer with low voltage wire.

Control of blackout lighting

An indication of what equipment designers are thinking of for lighting during blackouts may possibly have a bearing on the selection of a street lighting control system. This can only be of a preliminary nature, since the go-ahead signal for the designers will necessarily be the OCD regulations not yet issued. However, utility engineers can look forward to being required to supply current to and possibly control for the following:

(a) blackout street lighting.
(b) cautionary and directive signs.
(c) blackout traffic signals.
(d) camouflage lighting.

Present thinking is that blackout street lighting will have such low power requirements that 24-hour-a-day operation without control will be feasible. Plans for the other forms of blackout illumination do not seem to be far enough along to anticipate control requirements, although some connection with street lighting control would apparently be logical.

The one system that seems to have the versality to take care of the blacking-out of existing lighting and turning on of this special lighting to best advantage is the carrier system. However, probably the only provision that can be made for special blackout lighting in immediate plans would be an allowance of considerable additional capacity in control circuits and power sources.

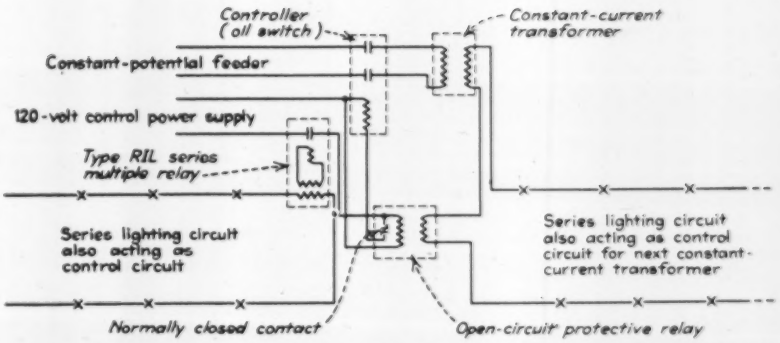

Controller (oil switch)
Constant-current transformer
Constant-potential feeder
120-volt control power supply
Type RIL series multiple relay
Series lighting circuit also acting as control circuit
Series lighting circuit also acting as control circuit for next constant-current transformer
Normally closed contact
Open-circuit protective relay

Fig. 5. A simple device for avoiding the change of oil switch and protector is the substitution of a suitable series-multiple relay for the time switch or photo-electric relay normally used.

Parking Meters Used By 347 Cities

One hundred and twenty-five cities installed parking meters in their "heavy parking" districts during 1941 and the first month of 1942, increasing the total number of municipalities using meters approximately 60 percent over 1940, according to the International City Managers' Association. The number of municipalities now using parking meters to relieve traffic congestion was 347 as of February 1, 1942. Twelve cities, including Lorain, Ohio, Rutland, Vt., and Winston-Salem, N. C., are scheduled to install meters soon.

The 1941 increase in the use of metered parking continues an uptrend from the first installations of the device in three cities in 1935. By 1939 a total of 141 cities had meters. Eighty-one cities added them in 1940, 110 in 1941, and 15 in the first month of 1942.

Typical average monthly revenue of one meter for the sample month of October, 1941, was $6.15, according to the association's survey. Meter revenue in cities of various sizes ranged from an average of $3.02 in cities under 5,000 population to $8.29 in cities over 500,000.

The majority of meters require a nickel coin, but an increasing number of cities—especially small ones—are installing penny meters. In this year's survey, 88 cities reported using some penny meters.

The largest cities with meters are Buffalo, Cleveland, Pittsburgh and Washington, D. C. Their average total monthly revenues in 1941 ranged from $2,633 from 280 meters in the nation's capital to $25,939 from 3,150 meters in Cleveland. Typical total monthly revenues in the small cities were $534 from 126 meters in Weston, W. Va., pop. 8,000; $359 from 155 meters in Scottdale, Pa., pop. 6,000; and $333 from 210 meters in Brookville, Pa., pop. 4,000.

Old Mine Converted Into Aircraft Plant

Contents in Brief—As part of the war effort English engineers have built numerous underground factories. One of the largest is an aircraft factory to employ 14,000 workers. The floors were concreted, but little treatment of the walls and ceiling was required.

THE LARGEST BRITISH underground aircraft factory has begun production, and by August the plant will be in full operation with 14,000 workers employed in two shifts of ten hours. The whole development covers 6 sq. mi., cost $22,000,000, and is the biggest of Britain's underground plants, although not the first.

The owners of the stone mine in which the factory is situated first approached the Aircraft Production Ministry in 1940, plans were prepared immediately, and work started in March, 1941. Since then more than 8,000 workmen have been engaged in the preparation of the underground site. When construction was started, much waste stone had been left in the mine or quarry and altogether a million tons of material had to be cleared away. The quarried stone was taken by light-gauge railway to the foot of conveyors, which carried it to the surface. It was then crushed and returned underground for use as aggregate for the concrete work. There was little new excavation.

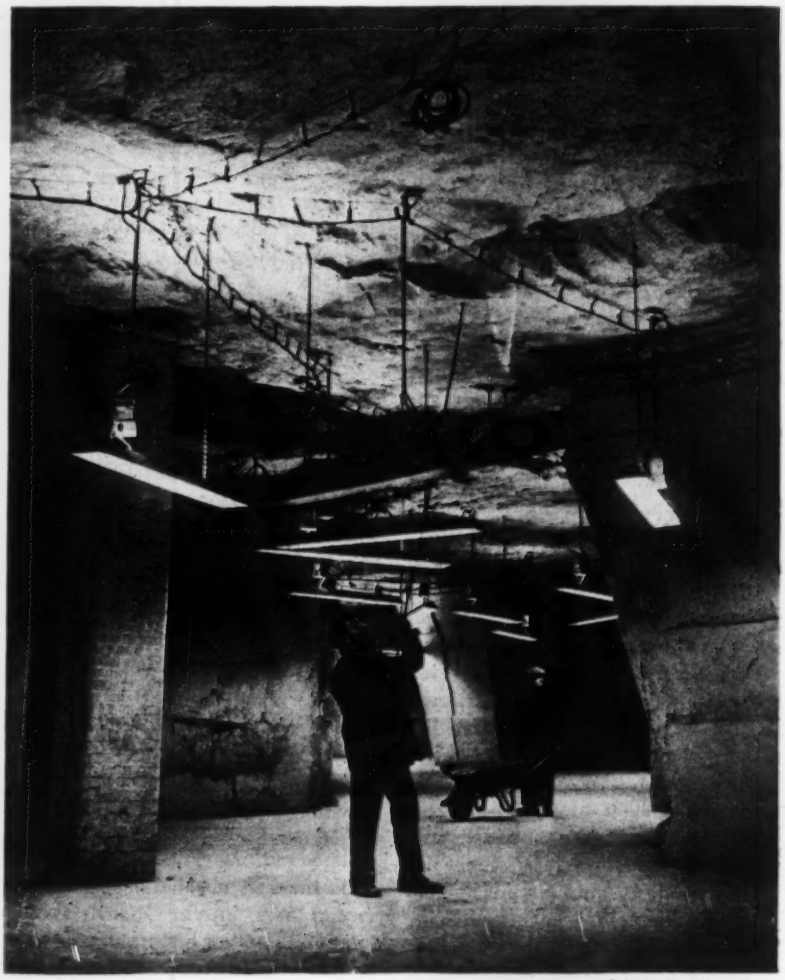
All the floors have been concreted, and some of the walls and the ceilings have been encased by fibreboard; but most of the walls have been left unchanged. Brick pillars have been erected at intervals to support the roof, and solid blocks of the original stone have been left standing. The underground space has been divided into workshop galleries.

Safeguards taken to protect the plant against underground dangers include drainage and sealing-off of wet areas, lowering of the groundwater table to below the factory floor, and systematic tests of the ceilings. The five 20-ft. dia. ventilation shafts emerge at the surface at such an angle as to prevent bombs from entering and exploding at the bottom. Similarly the eight passenger lifts—each carrying 50 persons—are protected by a 15-ft. thick slab of reinforced concrete.

Because of forced draught and exhaust ventilation the atmosphere in the underground factory, which is at a depth of 90 ft., is entirely satisfactory. Fluorescent light is provided by three different sources, including two emergency supplies. The factory has its own artesian well and water reservoir, and sewage is pumped to the surface by pressure pumps. Machinery is lowered by a hoist and shaft capable of taking pieces up to 20 tons in weight.

Experience in older underground factories suggests that the rate of illness among workers should be low. However, special care has been taken to counter adverse effects. The temperature is kept at an equal level of 60° F., which is a good temperature to prevent any possible damage to the roof and walls.

The surface buildings include everything a self-contained community of over 10,000 inhabitants requires. Besides hostels accommodating 1,000 persons each, there are flats for married workers, canteens, shops, hospital facilities, and a cinema.

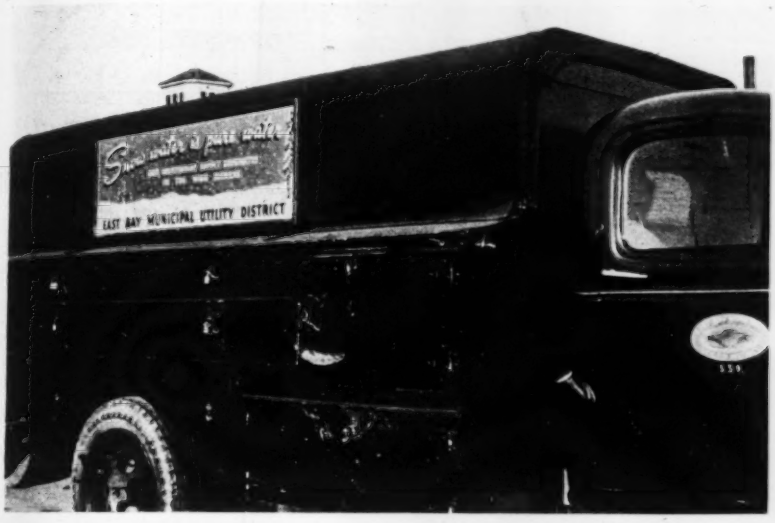


British Combine Photo

Fig. 1. Roof of underground British aircraft factory built in an old mine is inspected for possible loose rock. Fluorescent lighting and air conditioning with the temperature maintained at 60 deg. F. make for ideal working conditions. Note the many old pillars left in place and augmented by brick columns.

From Field and Office

Working problems and time-saving methods for engineers and contractors



Attractive posters, carried by this water district's service trucks, are changed every 60 days.

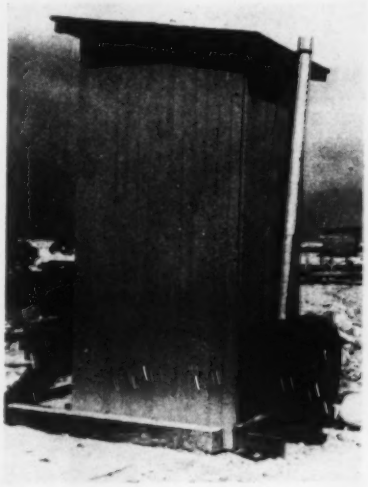
Signs on Service Trucks Help "Sell" Pure Water

Other utilities lose no opportunity to make a bid for public favor when opportunity presents itself, why should not a municipal water district do likewise? An affirmative answer to this appears in the policy of the East Bay Municipal Utility District at Oakland, Calif., whose service trucks carry posters designed to appeal to the public. The posters are changed every two months; each one shows some attractive scene and has a short explanatory statement. The one on the truck here shown pictures heavy snowfall on a high mountain range and the lettering reads "Snow Water is Pure Water"—Our Mokelumne supply originates in the High Sierra—East Bay Municipal Utility District."

Job Toilet Facilities Supplied on Rental Basis

On the Santa Fe Dam in southern California, workmen use toilets of the type shown in the illustration, which the contractor rents from a company supplying a continuous maintenance service during the life of the job. The receptacle is a 50-gal. metal drum, such as is commonly used for shipping oil. In addition to the inlet opening, the drum has a tightly covered 8-in. opening in the top of the projecting end of the drum. There is also a 3-in. vent opening from which a metal pipe leads up to roof level. Each unit, mounted on skids so that it can be moved about the job conveniently, is inspected by a maintenance man daily. Also, at necessary intervals, ranging from one to seven days, a service truck stops at each unit to clean it out.

This service is supplied by the California Sanitation Service, Inc., Los Angeles, Calif.

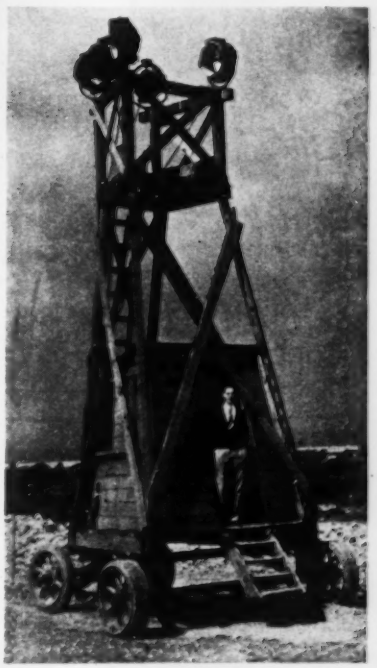


Portable toilet supplied and serviced on rental basis

Santa Fe Dam Night Lights

Five 1,000-w. lamps, mounted in floodlight projectors 20 ft. above ground, are carried on portable lighting units, assembled on the job, to supply light for night operations at Santa Fé Dam in Southern California. These units are spaced about 500 ft. apart along the dam crest. Each unit is self-contained with a gasoline-driven generator in the house from which leads serve each of the lamps separately. The engine is said to consume about 30 gal. of gasoline per 12-hr. run.

The running gear is a job-assembled trailer whose front end is an old truck axle. The rear axle is a 4-in. dia. pipe to the ends of which the spindles from the front axle of an old truck have been welded. With solid rubber tires on all four wheels, the rig can be towed readily behind a truck.



A job-assembled trailer for self-contained lighting-generator unit.

White Linoleum for Drafting Table Tops

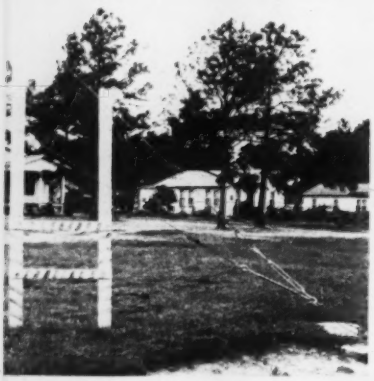
White linoleum is an excellent material for drafting table tops. It works well with scotch tape, is hard enough for tracing, does not reflect light with a glare, and has the great advantage of permitting unlimited figuring and notations, if a soft pencil is used, that can be removed easily with a pencil eraser.

The Wailes-Bageman Co., Los An-

geles, has equipped its new drafting room with white linoleum-topped tables on which the edges of the linoleum are protected by a wood molding, on all four sides, finishing flush with the linoleum surface.

Guy Line Guard Prevents Accidents

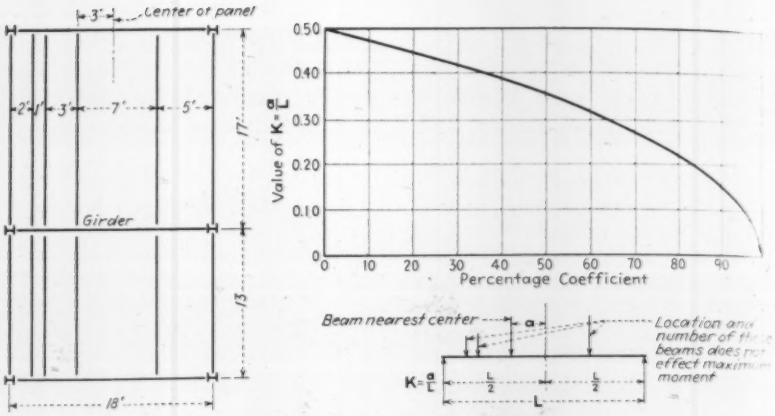
When it was necessary to have guys from a construction derrick in an adjoining field, the wires were carried across the roadway leading to the owner's house. Since the guys were difficult to see at night, they were regarded as a hazard in case the landowner diverged slightly from his usual course when driving in. To prevent accident and to protect the guys against possible collision, two



Inexpensive marker reduces chance of damage to guys of construction derrick, thus providing safety to landowner, derrick, and nearby workers.

2x4-in. posts were set into the ground and the guy stapled to these at their upper ends. A pair of cross braces at 1½ and 3 ft. above the ground were added.

Both uprights and cross members were painted with diagonal alternating stripes of black and white, as shown by the accompanying photograph, making the structure clearly visible to an approaching car. Thus, it was easy to note the presence of the obstructing wires, and the drivers were guided away from the guy hitch at little expense or but a fraction of the damages which might have been collected for even a minor car accident. There was also greater safety for the derrick and workmen on the job.—CHARLES C. LYNDE, *P. O. Box 1129, Houston, Texas.*



SECTION MODULUS OF GIRDERS

In designing girders supporting uniformly loaded floor panels in which the floorbeams are not uniformly spaced, it is not necessary to compute the reactions of the beams and apply these as individual loads on the girder. Simply consider half of each panel load as a uniformly distributed load on the girder, and the section modulus required on this basis may be multiplied by a coefficient depending only on the location of the beam nearest the center of the girder.

The position of the other beams, regardless of their number, does not affect the maximum bending moment, which occurs under the beam nearest the center. For example: Assume the intensity of uniform load, including weight of beams, at 300 lb. per sq. ft. and the allowable unit of stress at 18,000 lb. per sq. in.

Then W = 300 x [18 (17 + 13)] ÷ 2 = 81,000 lb.

$$\text{Section modulus} = \frac{81{,}000 \times 18 \times 12}{8 \times 18{,}000}$$

= 122.

K = 3 ft. ÷ 18 ft. = 0.167 and, from the chart, the required coefficient = 0.89. Therefore the correct required section modulus = 122 x 0.89 = 108. —PAUL FISCHER, Commonwealth & Southern Corp., Birmingham, Ala.

Bulkhead Keeps Rock Off Roadway

Where 20-cu. yd. dump-truck bodies are filled under the bunkers that hold plus-6 material for Santa Fé Dam in Southern California, spillage that resulted when stone bounded over the truck sides had to be cleared out of the roadway. To reduce the labor cost involved in this operation, an inclined barrier of heavy timbers was built, on the side of the roadway opposite the bunkers, with its upper end projecting under the overhanging edge of the truck body. With this arrangement, any spillage strikes the timbers and bounds on beyond the roadway limit.

A sloping bulkhead of heavy timbers keeps rock spillage from under truck wheels

Book Notes and Reviews

The month's addition to the engineer's reading and reference list

Army Engineers

WHAT THE CITIZEN SHOULD KNOW ABOUT THE ARMY ENGINEERS—By Lt. Col. Paul W. Thompson. 204 pp. W. W. Norton & Co., New York. $2.50.

Timely information on what engineers do in the army will be found in this book, one of a series on the several arms of the military service being issued by Norton & Co. The book opens with a brief history of the Corps of Engineers. This is followed by a broad sketch of how the army is organized so that the reader can get a proper understanding of the relation of engineer troops to the army as a whole. The remainder of the book is given over chiefly to well illustrated descriptions of the functions served by engineer combat troops and engineers behind the front. The civil functions of the Corps of Engineers, which are well known to readers of this journal, are not included.

Hydraulics Text Revised

HYDRAULICS—By George E. Russell. Fifth edition. 468 pp. Henry Holt and Co., New York. $4.25.

Russell's Hydraulics has been a standard text for thousands of engineers since 1909. This edition provides a complete revision of the text in the light of recent developments in the rational analysis of fluid flow. Unlike the majority of books recently issued, the author does not swing completely over to the mathematical abstractions of fluid mechanics. Rather, there is an attempt to provide a thorough background in the fundamental principles of fluid flow, correlating these with the practical viewpoints of hydraulics and hydraulic engineering.

In comparing the fifth edition with previous ones, the reader will be impressed by the more extensive mathematical derivations of laws and formulas hitherto arrived at empirically. The use of the calculus is resorted to more frequently, but not to the extent of leading the practical engineer astray in the realms of higher mathematics.

The outstanding difference between this and most textbooks on hydraulics is its inclusion of chapters on hydraulic machinery. Fundamentals of operation are derived from the hydraulic principles developed in the first ten chapters of the book. These are carried out to give the reader a theoretical understanding and practical knowledge of many of the phases of the design and operation of hydraulic turbines and centrifugal pumps.—*Reviewed by* ROLF ELIASSON, *Professor of Sanitary Engineering, New York University.*

Sediment Loads in Streams

A STUDY OF METHODS USED IN MEASUREMENT AND ANALYSIS OF SEDIMENT LOADS IN STREAMS—A cooperative study by the Corps of Engineers, U. S. Army; Water Resources Branch, U. S. Geological Survey; Indian Service; U. S. Bureau of Reclamation; Flood Advisory Committee, Dept. of Agriculture; and the Tennessee Valley Authority. Conducted at the Iowa Institute of Hydraulic Research. Published by U. S. Engineer Office, St. Paul, Minn. (For prices of the separate reports, see *ENR* March 26, 1942, p. 501).

This series of reports sets forth the results of intensive experimental studies conducted at the Hydraulic Laboratory of the University of Iowa over a period of two years, for the purpose of determining the relative value of results obtained by different methods of sediment sampling in natural streams. These methods concern both the suspended load and the bed load.

In view of the wide variety of practices which have developed in this field, and concerning which opinions also differ widely, the results of these studies should be of profound practical interest to the engineering profession. They are indicative that existing practices, in nearly all cases, are capable of improvement.

Report No. 1. Field Practice and Equipment used in Sampling Suspended Sediment. Two highly important aspects are considered: Location of sampling points in a selected cross-section of the stream, and the frequency with which sampling should be done. In both, cost is really the most troublesome factor. It has been responsible in most sediment investigations for the devising of short-cut methods, deemed to be close enough for practical purposes. It appears from the data submitted that inadequate time schedules for taking samples, rather than arbitrary location of sampling points, have produced the greater errors. In this connection, seasonal conditions and more especially momentary conditions, as for instance during the initial rise of a flood wave, when the suspended load concentration runs very high for a short time followed by marked dilution, if not recognized and adequately sampled, give rise to serious errors.

Much attention is given to errors inherent in sampling devices due to their construction and the peculiar limitations of each type are presented. This feature in particular merits the attention of all engineers concerned with sediment sampling.

Report No. 2. Equipment used for Sampling Bed Load and Bed Material. Bed-load samplers of the basket, pan, and pressure-difference types, and bed-material samplers of the drag-bucket, vertical and grab-bucket types are described, the text being essentially a review of what has been accomplished elsewhere. Of particular interest are the results of calibrations of samplers by well known authorities.

The pressure-difference type is recommended as best suited for sandy beds. The box or basket type, on the other hand, is the only kind deemed suitable for coarse gravel bed-load.

Report No. 3. Analytical Study of Methods of Sampling Suspended Sediment. This report deals with the methods used in choosing sampling points in a vertical cross-section, but does not include consideration of the spacing of the verticals in a cross section. The relation of the turbulence theory to the vertical distribution of suspended sediment, known as the turbulence-suspension theory, forms an important part of the discussion. The object of the report is to evaluate the errors in the various methods of suspended sediment sampling used to compute the average concentration in a given vertical.

Report No. 4. A Study of Methods used in Measurement and Analysis of Sediment Load in Streams. A description and discussion of labora-

tory methods of determining particle size, more particularly for suspended-load samples, reveals that the majority of present-day methods are not sufficiently sensitive and accurate for very low concentrations. Laboratory procedure is entered into in considerable detail, and several relatively new methods are presented which appear to be advantageous for use with certain types of sediment.

Report No. 5. Laboratory Investigations of Suspended Sediment Samplers. This report is a sequel to Report No. 1. It contains the results of laboratory tests on various types of suspended sediment samplers to determine the causes and magnitudes of the errors in sampling, particularly those due to entrance conditions, accumulations of sediment in the sample container, and loss of sediment in transferring samples to containers for shipment. "These studies showed that errors of serious magnitudes were found to result from certain, not unusual, entrance types which cause the flow conditions in the vicinity of the sampler to become disturbed with tendency toward segregation of the water and sediment."

An important source of error covered in this report is that due to initial pressure-differential in the filling of slow-filling-samplers of the integrating type, resulting in a non-representative rate of filling. As integrating types represent the latest development, and are intended to collect the sample with a more or less smooth-filling action over a period of time, so as to obtain a sample representing the mean of the fluctuating concentration, the source of error here mentioned should be carefully considered by engineers.

An appraisal of this report series leads to the conclusion that sampling practices are in need of improvement both as to instruments and methods. The inevitable conclusion also must be that much of the river sediment data which have been published in the past must be accepted with more reservation as to their probable accuracy and comparability than has been customary.

That serious errors may result from sampling at a fixed hour, day by day, or at longer intervals, has been clearly shown by these investigations. But this still leaves unmentioned the sudden changes caused by tributary behavior. The assumption that a stream's momentary sediment load is representative of the yield from its watershed is fundamentally erroneous. A flood, or even a brief rise, in a single tributary may, and frequently does, affect the turbidity of the main stream appreciably for a relatively short time. Even in so large a river as the Lower Mississippi, these changes in turbidity are quite marked and usually traceable to the outpourings from a single tributary or group of tributaries.

Broadly speaking, the practical difficulties and economic limitations which confront the engineer today in both suspended-load and bed-load sampling are many. If a review of these difficulties and limitations could be presented as a sequel to the investigations covered in this report series, it would assist engineers in evaluating the relative importances of the technical shortcomings recited in these reports as against the shortcomings introduced by practical difficulties and economic limitations.—*Reviewed by* GERARD H. MATTHES, *head engineer; Office of the President, Mississippi River Commission, Vicksburg, Miss.*

A Builder Look Back

SIXTY YEARS A BUILDER—Autobiography of Henry Ericcson written in collaboration with Lewis E. Myers. 338 pp. A. Krock & Son, 206 N. Michigan Ave., Chicago, Ill. $3.50.

The active life of few builders has spanned so large a part of the total building history of a great city as has that of Henry Ericcson of Chicago. Trained as a brick mason in his home country, the twenty-year-old Swedish lad came to Chicago in 1882, got work at his trade, became successively foreman, superintendent and contracting builder, to leave his record in tall buildings that to-day mark the skyline of his home city. This volume is more than the story of Ericcson's building life for it carries the history of Chicago building back to 1856 by means of the records of John M. Van Osdel, the city's most noted architect-builder for the decades immediately preceeding and following the Chicago fire of 1871. The temptation is great to wander into this early history, for Ericcson has not confined himself to a categorical account of buildings erected and dates of new developments in building construction materials and technique. Instead he has written the gossipy reminiscences of a man who has lived this building history and knew and worked with, indeed was one of, the great builders and building investors who made this history. The theme is always building, but building as affected by business progress, by civic life and municipal politics, by transportation growth, by labor troubles, by new materials and inventions and most of all by men with courage to wager their money on the ideas of architects and engineers who in turn introduced the floating foundation, the caisson foundation, tile floor construction, and steel frames. To one who has time to follow the leisurely pace of reminiscence about the building life of a great city, this book has much interest.—*Reviewed by* C. S. HILL, *associate editor (retired), Engineering News-Record, Long Branch, N. J.*

Miscellaneous Notes on Booklets and Reprints

ANOTHER STUDY of the controversial subject of whether car owners are paying an appropriate share of the cost of building and maintaining roads is contained in Bulletin 152, Iowa Engineering Experiment Station, Ames, Iowa, entitled "Analysis of Highway Cost and Highway Taxation, with an Application to Story County, Iowa." This study finds that on the ton-mile basis of measuring benefits the passenger car owners of Iowa are paying more than their share of highway costs, that owners of light trucks are paying their share, but that owners of heavy trucks are not paying their full share.

DEFINITIONS OF ELECTRICAL TERMS is the title of a new set of American standards being published by the American Institute of Electrical Engineers, 33 West 39th St., New York. (Price $1.)

HIGHWAY ENGINEERS will find much of value in a pamphlet "Naturalization of Roadbanks" (Technical Note No. 51) published by the Appalachian Forest Experiment Station, Asheville, N. C. Studies in stabilization of cut slopes and in stimulating natural growth on cut and fill slopes made at the station are described in

(*Continued on p.* 108)

HERE'S THE ENTIRE INJECTION SYSTEM OF THE HD-7 ENGINE

. . . the unit injectors that measure, inject and atomize the fuel, *directly* into the cylinders. That's why combustion is more complete, smoother . . . why starting is easier . . . why servicing and maintenance costs are cut . . . why 2-Cycle Diesels have earned the "rep" as the most simple, dependable engines on the job.

The unit injection system eliminates costly delays . . . factory servicing . . . delicate adjustments! No grief with leaky, clogged, or air-locked high pressure fuel lines . . . because there *are no high pressure lines*. No trouble with costly, troublesome fuel pumps . . . because there *are no fuel pumps*.

Simplicity of design is carried throughout the entire engine so that Diesel experts are unnecessary . . . so that repairs or adjustments are seldom required . . . so that your job keeps running in high gear at all times. Any way you look at it you're ahead with 2-Cycle Diesel power—it offers you more value, more performance, more work for your dollar! Get the inside story of these remarkable engines in our booklet "Modern Tractor Power."

ALLIS-CHALMERS
TRACTOR DIVISION · MILWAUKEE · U. S. A.

2-Cycle
THE MODERN DIESEL POWER

HELP BRING VICTORY

1. Extend the life of your present equipment . . . make needed repairs, replace worn parts. Your Allis-Chalmers dealer is prepared to give you A-1 service!
2. Sell your scrap! Your country is in urgent need of scrap!
3. Keep in touch with your Allis-Chalmers dealer . . . even if you have no priority rating. You may find good buys on used equipment.

3 SIZES: HD-7, HD-10, HD-14
60 TO 132 DRAWBAR H.P.

MATERIALS AND LABOR PRICES

Market quotations on construction materials and wage rates reported monthly by ENR correspondents

LUMBER PROVIDED the most important price change in the construction material list for May. Short leaf Southern pine is $1.00 higher in Baltimore; up $2.00 to $5.00 on the 1- and 2-in. sizes in New York; and $5.00 higher in Philadelphia. Douglas fir is up 50c. to $1.00 in Baltimore; up $2.50 to $3.00 in New York; and $1.00 higher on 1x8-in. and 2x4-in. sizes in Chicago. Freight rate schedule on Douglas Fir Plywood was up effective March 18, 1942.

Reinforcing steel bar price increased in Los Angeles due to the all-rail shipment route. Portland cement remains unchanged from a month ago. Gravel is up 15c. per ton in New Orleans, but sand is off 35c. there. Ready-mixed concrete climbed in Cleveland, New Orleans and New York. Structural clay tile is up in all sizes in Baltimore. Some of the ready-mixed paint prices, particularly in Birmingham and Kansas City are not available except with a priority rating, and then are quoted specially.

Carpenters' rate in Birmingham now ranges from $1.125 to $1.25, whereas the lower rate prevailed previously. Most of the construction labor rates in Montreal increased in May, and indications are that the remainder will rise in June. Common labor rates are unchanged from a month ago in the *ENR* reporting cities in the United States.

CEMENT, AGGREGATES, READY-MIXED CONCRETE—F.O.B. CITY

	PORTLAND CEMENT			SAND AND GRAVEL			CRUSHED STONE		CRUSHED SLAG		CONCRETE
	Per bbl., carload lots, including 40c per bbl. for bags, cash discount not deducted			Per ton, carload lots			Per ton, carload lots		Per ton, carload lots, f.o.b. plant		Ready Mixed 1:2:4, 50 c.y. or more, delivered
	Cloth Bags *a*	Paper Bags	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	
Atlanta	$2.73	$2.48	$2.43	$1.75	$1.85	$1.95	$1.75	$1.85	$1.55	$1.65	$8.00
Baltimore	2.36	2.11	1.91	1.75‡	1.75‡	1.25‡	1.75‡	1.75‡	1.75‡	1.75‡	7.25
Birmingham	2.50	2.25	....	1.75	1.75	1.50	1.00	1.00	.90	1.15	5.80
Boston	2.75*b*	2.50*b*	2.30	1.40‡	1.40‡	1.00‡	1.40‡	1.40‡	....	....	7.25*m*
Chicago	2.60	2.35	2.20	2.00‡*d*	2.00‡*d*	2.00‡*d*	2.00‡*d*	2.00‡*d*	1.50‡	1.50‡	....
Cincinnati	2.31	2.06	1.81	1.20	1.20	1.10	1.80	1.80	....	....	6.60
Cleveland	2.39	2.14	....	1.60*i*	1.60*i*	1.55*i*	2.05*i*	2.05*i*	1.70*i*	1.70*i*	7.70*i*
Dallas	2.52	2.27	2.07	1.75*p*	2.00*p*	1.25*p*	1.69*p*	1.84*p*	....	....	6.20
Denver	3.08	2.88	....	1.20	1.40	.90	....	....	....	....	7.25
Detroit	2.40	2.15	1.95	1.50	1.60	1.10	2.25	2.25	2.00‡	2.00‡	6.50
Kansas City	2.58	2.33	2.18	1.85	2.30	1.00	1.91	1.91	....	....	7.50*m*
Los Angeles	2.80*c*	2.20*c*	....	1.20	1.20	1.15	1.20*f*	1.20*f*	....	....	6.35
Minneapolis	2.90	2.65	....	1.00*h*	1.00*h*	.25*h*	1.00*h*	1.00*h*	....	....	7.35*j*
Montreal	....	1.95*rs*	1.79*rs*	....	....	1.25‡*t*	.85‡*ct*	1.00‡*ct*	....	....	6.45*ts*
New Orleans	2.41	2.16	1.96	1.65	1.65	.90	....	....	....	....	9.25
New York	2.55‡	2.30‡	....	1.60*de*	1.60*de*	.90*de*	1.70*de*	1.80*de*	....	....	7.00
Philadelphia	2.32	2.07	1.87	1.55‡	1.65‡	1.20‡	1.90	1.95	1.10	1.10	8.20*k*
Pittsburgh	2.44	2.19	1.99	1.40‡	1.40‡	1.70‡	2.25‡	2.25‡	1.50	1.50	8.25
St. Louis	2.80	2.52	....	1.50‡	1.50‡	1.25/1.50‡	1.10*h*	1.10*h*	.75*g*	.75*g*	8.00
San Francisco	....*u*	2.21	1.81	1.36	1.36	1.36	1.46	1.46	....	....	7.55
Seattle	2.95*o*	2.70*o*	....	1.00*o*	1.00*o*	1.00*o*	2.00*o*	2.00*o*	....	....	7.25

‡ Delivered. *a* 10c. allowed for each returnable bag. *b* 10c. per bbl. off for cash. *c* Plus municipal tax. *d* Per cu. yd. *e* Barge lots alongside docks. *f* Crushed granite. *g* F.o.b. Granite City, Ill. *h* F.o.b. plant. *i* Within three miles of Public Square. *j* 5% discount for cash. *k* Discount 35c. 500 to 2000; 70c. 2000 to 5000; 95c. over 5000. *l* Up to 200 cu. yd. *m* 50c. off for cash. *n* 25 c.y. or more. *o* 2% off for cash. *p* 10c. per ton off, cash 15 days. *r* 10c. per bbl. off, cash 20 days. *s* 8% sales tax included. *t* 8% sales tax not included. *u*. Price withdrawn. *v* 20c. per bbl. discount; 20c. allowed for returnable cloth bag.

CASH DISCOUNTS CEMENT to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount 10c. per bbl. for payment within 15 days of date of invoice. Subject discount 10c. per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICES RECEIVED AT CEMENT MILL

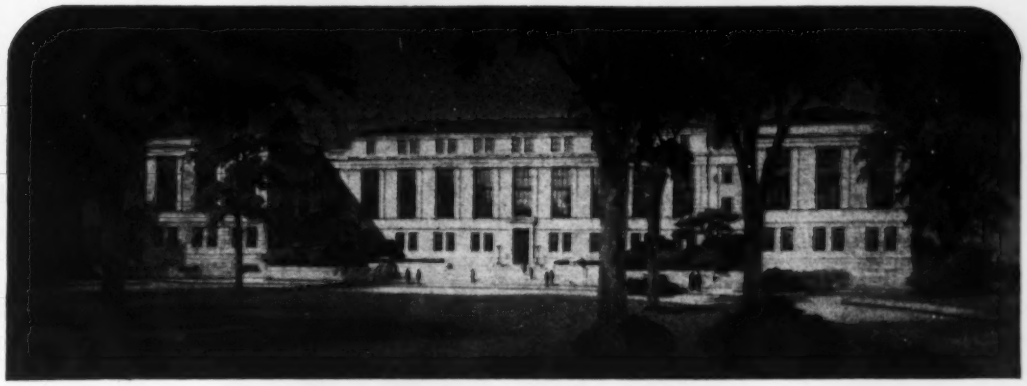
Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable.

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Buffington, Ind	$1.70	$1.65	Ironton, Ohio	$1.60	$1.55	Richard City, Tenn	$1.80	$1.75
Dallas, Tex. (Inc. 10c. tax)	1.85	1.80	Limedale, Ind	1.70	1.65	Steelton, Minn	1.80	1.75
Hannibal, Mo	1.70	1.65	Norfolk, Va	1.75	1.70	Universal, Pa	1.65	1.60
Hudson, N. Y	1.75	1.70	Northampton, Pa	1.55	1.50	Waco, Tex. (Plus 10c. tax in Tex.)	1.75	1.70
Independence, Kans	1.70	1.65	North Birmingham, Ala	1.70	1.65	Montreal (8% sales tax incl.)	1.68	1.67

PAVING BRICK, BLOCKS, ASPHALT, ROAD OILS—F.O.B. CITY

	PAVING BRICKS AND BLOCKS			PAVING ASPHALT		ASPHALT BINDERS—FLUXES		CUTBACK ASPHALT		ROAD OILS	ASPHALT EMULSION (Quick-breaking)	
	Granite per M. lots of 50,000 4x4x8 in.	Brick per M. 3x4x8½ in. carload lots	Wood per sq. yd. 3½ n. 16-lb. treat	Per ton, less than 80 penetration		Per gal., 80–300 penetration		Per ton		Per gal.	Per gal.	
				Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	$73.00	$39.35	$2.25	$18.40*e*	$24.62*e*	$0.0787*e*	$0.1309*e*	$0.0826*he*	$0.1348*h*	$0.0676*e*	$0.0826	$0.1348
Baltimore	145.00‡	45.00‡	2.90	14.00*	20.00*	.06*	.09*	.065*h**	.115*h**	.....	.....	.....
Birmingham	.....	32.00*j*	...	17.95	.....†	.0747	.....†	.0834*h*	.....†	.065	.09	.....†
Boston	85.00	55.00	3.75	14.00	20.00	.06	..09	.065*h*	.115*h*	.065	.09‡	.12‡
Chicago	150.00	50.00	2.00*d*	14.50	20.00	13.00*g*	18.50*g*	.065*h*	.12*h*	.06	.10	.14
Cincinnati	112.00	37.50	....	16.40	.....	.085	.....	12.25	.....	.07	.085	.....
Cleveland	110.00	38.50	2.25	20.00	25.00	.09	.155	.105*h*	15.00	.07	.11	.15
Dallas	.....	36.00	....	13.25	20.30	.06	.103	16.00	24.80	.055	.05/.07	.07/.09
Denver	.....	27.50	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Detroit	.....	37.50	....	15.10*f*	22.60*f*	.0725	.1262	15.10	21.10	.067	.0725	.1262
Kansas City	.....	40.00	....	18.50	23.50	.077	.1075	.077*h*	.107*h*	.057	.11	.15
Los Angeles	.....	50.00	....	7.00*b*	16.00	7.00*bg*	16.00*bg*	6.00*b*	.....	.025	.0525	.1125
Minneapolis	.....	.....	1.87*d*	21.20	27.70	.....	.126	.....	32.64	.....	.....	.....
Montreal	.....	.....	....	16.60*k*	24.25*k*	.115*k*	.1485*k*	.115*hk*	.135*hk*	.08*k*	.135*k*	.188*k*
New Orleans	.....	.....	....	13.00*a*	19.00*a*	.055	.085	.06*h*	.09*h*	.....	.078	.....
New York	.....	.....	....	15.00*	21.00*	.06	.09*	.065*h**	.115*h**	.....	.0725	.1225
Philadelphia	130.00	55.00	3.92	14.00	22.00*	.055	.12*	.065*h*	.13*h**	.055	.065	.13*
Pittsburgh	135.00	38.75	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis	.....	37.00	....	16.00	21.00	15.00*g*	21.00*g*	.0625*h*	.1125*h*	.05	.095	.1275
San Francisco	.....	70.00	....	9.50*m*	18.00*m*	9.50*gm*	18.00*gm*	10.00*m*	17.50*m*	9.50*gm*	.0525*m*	.1125*m*
Seattle	.....	60.00*c*	....	9.50*i*	25.85	.....	25.10*g*	10.00	.....	9.50*i*	.0575*i*	.1308*i*

‡ Delivered. *a* F.o.b. Baton Rouge. *b* Delivered to purchaser's warehouse. *c* 3½x4x8½ in. *d* 2½ in. 12-lb. treatment. *e* Local reduction due to 20% reduction intra-state class freight rates, only Georgia affected. *f* Mexican. *g* Per ton. *h* Per gallon. *i* F.o.b. Martinez. *j* 3x3½x8½ in. *k* Tax included. * December asphalt prices; none later available. † Available on priority only and quoted specially. *m* March prices latest available.



Home Office of National Fire Insurance Company of Hartford.

133,000 feet of National Seamless Pipe Piles assure firm foundation for

NATIONAL FIRE INSURANCE COMPANY OF HARTFORD

WHY were seamless steel pipe piles selected for this job? These are the chief reasons: They have greater supporting strength. They cost less for deep and difficult penetration. Practically any depth can be reached. They can be inspected full length after driving.

No other material lends itself so readily to the endless variety of subsoil conditions encountered in different localities. You can drive these piles through formations ranging from easily penetrated sand, silt and peat to the more resistant gravels or hardpan. Unusual obstructions such as abandoned cribbing, timbers and boulder-filled excavations can be penetrated and the piles settled on solid rock. Special driving points are welded to the pipe under such conditions.

NATIONAL Seamless Pipe Piling has been used with great success for large buildings, express highways, bridge approaches, viaducts, piers and other structures requiring substantial foundations. For complete engineering information, write for our Bulletin No. 27.

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

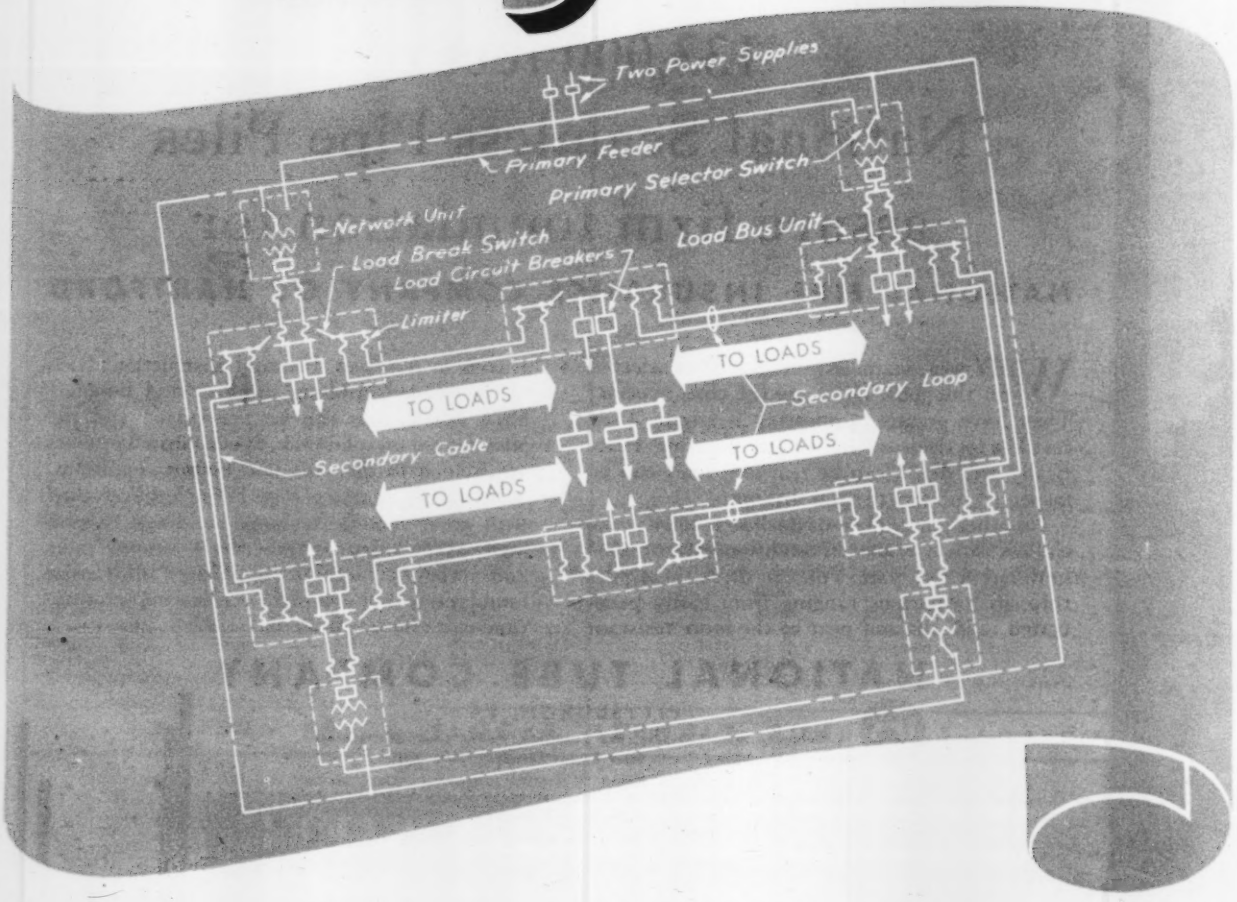
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

National Seamless Steel Pipe Piles form a safe foundation that will meet every requirement of strength, permanence, and economy. These are 14" O.D. x 7/16" thick.

NATIONAL SEAMLESS PIPE PILES

voltage regulation



HOW THE PLANT NETWORK SYSTEM IMPROVES VOLTAGE REGULATION

Voltage regulation is better and more uniform with the Plant Network System. Power is carried in at high voltage as close to the load as possible by locating network units at the centers of load areas. Secondary feeders to individual loads are kept at minimum length and network units are tied together with a secondary loop to provide at least a two-way feed to all load buses.

Control equipment is greatly simplified because improved regulation makes possible across-the-line starting of large motors.

WESTINGHOUSE

Westinghouse

BETTER and MORE UNIFORM with Plant Network System

Careful engineering, wise factory planning and accurate machine design are not enough to keep production rolling. It takes power, dependable power, to deliver the results of skillfully engineered production lines.

For maximum results, power must be uniform throughout the plant. Until now, however, this has been difficult to obtain. With the conventional radial system of power distribution, voltage regulation is not uniform because of the unavoidable voltage drop in long low-voltage feeder lines. Now, with the Plant Network System, this trouble can be avoided.

Under this system, voltage regulation is approximately the same at all points in the plant. Power is carried in at high voltage as close to the load as possible by locating network units at the centers of load areas. This keeps secondary feeders to individual loads at minimum length.

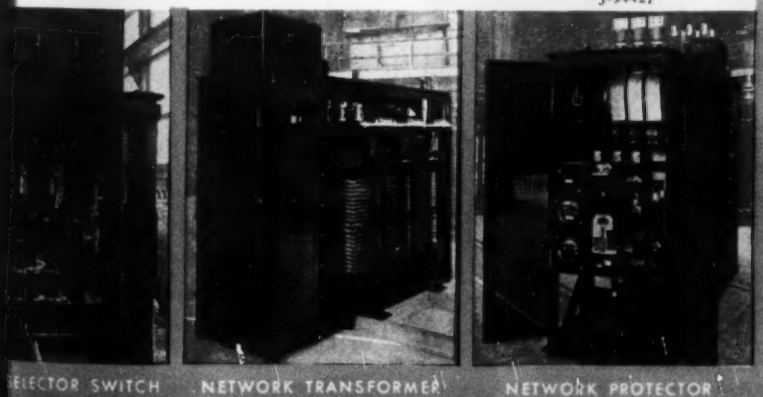
But better and more uniform voltage regulation is only one of the Network System's advantages. It provides far greater reliability and protects against sabotage. A failure in any primary feeder or secondary loop is automatically isolated with no interruption in power. Service can not be interrupted as a result of a single fault at any point within the plant.

Other important advantages include the ability to shift loads without shutting off the power and the ease with which the Network System can be extended.

Complete information on the Westinghouse Plant Network System should be in your files. This system should be seriously considered for every new plant or plant addition.

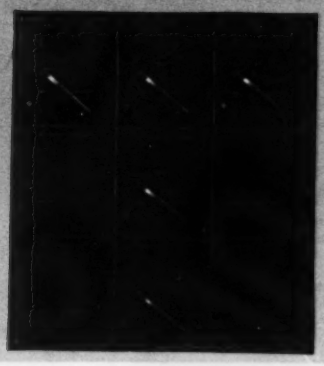
Write today for the Westinghouse book on plant distribution systems, B-2306. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania.

J-94427



ELECTOR SWITCH NETWORK TRANSFORMER NETWORK PROTECTOR

ALL NETWORK EQUIPMENT IN TWO COMPACT UNITS



NETWORK LOAD BUS UNIT

The Westinghouse Network Load Bus Unit provides limiters for fault protection for the secondary loop cables and air breakers for the load circuits. Load break switches permit isolating the limiters for repair or maintenance.

AIR-COOLED NETWORK UNIT

This compact unit made up of Double-Throw Primary Selector Switch, Air-Cooled Transformer and Network Protector shown at left, saves space and simplifies installation and eliminates fire hazards.

PLANT NETWORK SYSTEM

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS ¼-in. billet *b*	RIVETS ½-in structural	WIRE NAILS Base *d*	SHEET PILING Base	STEEL RAILS Per Gross Ton Standard	Light	Re-rolled	TRACK SUPPLIES Angle Bars	Std. Spikes *c*	Tie Plates *c*	Track Bolts
Birmingham	$2.10	$2.15	$3.75	$2.55	.....	$40.00	$40.00	$39.00	$2.70	$3.00	$2.15	$4.75
Chicago	2.10	2.15	3.75	2.55	$2.40	40.00	40.00	39.00	2.70	3.00	2.15	4.75
Pittsburgh	2.10	2.15	3.75	2.55	2.40	40.00	40.00	39.00	2.70	3.00	2.15	4.75
Buffalo	2.10	2.15	.....	.....	2.40	.....	.....	.....	.....	.....	2.15	.....
Cleveland	2.10	2.15	3.75	2.55	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown	.....	2.15	.....	.....	.....	.....	.....	.....	.....	3.00	.....	.....
Detroit	.....	2.25‡	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gulf ports	2.45*a*	2.50*a*	.....	.....	2.85*a*	.....	.....	.....	.....	.....	.....	.....
Pacific ports	2.75*a*	2.80*a*	.....	.....	2.95*a*	.....	.....	.....	.....	.....	2.30	.....

‡ Delivered. *a* F.o.b. cars dock. *b* Rail steel same as billet prices. *c* Other basing points include Portsmouth, O., Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., and Pacific coast ports, on tie plates, alone, Steelton, Pa., on spikes alone, Lebanon, Pa., Richmond, Va. *d* Add switching charge $1.8 per ton.

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LB., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS* Per 100 lb., ¼ in., base price 15 tons or over *b* New billet	Rail steel	Add Switch	$/cwt. for Del.	EXPANDED METAL LATH Per 100 sq.yd., carload lots Std. diamond mesh, 3.4 lb.	Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING Per 100 s.f., carload lots 4x16 in., No. 5 & 10 wires	6x6 in. No. 1x12 in., No. 8 & 12 wires	6 & 6 wires Per sq. yd.	SHEET PILING Per 100 lb. base price
Atlanta	$2.34	$2.39	$2.39	$.02½	$.10	$21.06	$23.00	$1.82	$1.35	$0.1719	$3.04
Baltimore	3.70	2.90	2.75	.....	.10	30.00	32.00	1.70	1.27	.1611	3.00
Birmingham	2.10*a*	2.15	2.15	.02½	.10	19.00	21.50	1.80	1.34	.1701	.....
Boston	3.85	3.51	3.36	$20 C.L.	.10	18.50	29.50	1.76	1.31	.1656	2.70
Chicago	2.10*a*	2.15	2.15	.03	.05	21.50	23.50	1.67	1.25	.1575	2.40
Cincinnati	3.68	2.53*c-d*	2.53*c-d*	.....	.05	19.50	21.50	1.66	1.25	.1566	.....
Cleveland	2.10*a*	2.15	2.15	.02½	.10	19.50	21.50	1.66	1.25	.1566	.....
Dallas	6.00	3.40	3.40	.....	.....	24.50	26.50	1.93	1.42	.1827	.....
Denver	4.35	3.95	3.80	.....	.....	26.50	28.50	1.97	1.45	.1863	.....
Detroit	3.65‡	2.34	2.24	.....	.10	22.00	24.00	1.68	1.26	.1584	2.66
Kansas City	4.00	2.64-*d*	2.64-*d*	.0	.05	19.50	23.50	1.78	1.33	.1683	2.89
Los Angeles	3.65*f*	3.32*j*	3.32*j*	.02½	.05	23.00	27.50	1.93	1.42	.1827	3.65
Minneapolis	3.80†	2.50*e*	2.50*e*	.0	.10	25.00	27.00	1.80	1.34	.1701	2.75*d*
Montreal	3.90*i*	2.65*i*	2.55*i*	.....	.....	26.00*hi*	33.00*hi*	2.38*i*	3.22*i*	.264*i*	.....
New Orleans	4.40	2.52	2.52	.05	.10	21.50	23.50	1.82	1.35	.1719	2.875
New York	3.75	2.76*e*	2.76*e*	.....	.15	17.50	19.50	1.76	1.32	.1665	2.74
Philadelphia	3.65	3.85	.....	.....	.....	19.50	21.50	1.71	1.28	.1611	2.74
Pittsburgh	2.10*a*	2.15	2.15	.02½	.10	23.00	26.50	1.59	1.20	.1503	2.40
St. Louis	3.69	2.39	2.39	.0	.05	28.00	34.00	1.69	1.27	.1602	2.70
San Francisco	4.25	2.65	2.50	.02½	.10	21.00	24.50	1.93	1.42	.1827	3.85
Seattle	2.75*e*	2.50*e*	.....	.....	.....	34.50	38.50	1.93	1.42	.1827	2.95*ej*

‡ Delivered. *a* Mill prices. *b* 5-15 tons, add 15c. 1-5 tons, add 25c. Less than 1 ton, add 50c. *c* 20 tons or over Base. *d* Mill price plus freight. *e* F.o.b. dock. *f* Includes delivery in free delivery zone. *g* Less than 1 ton, add 25c.; 1 to 5 tons, add 10c. High scrap steel prices cut former 15c. differences between new billet and rail steel in many mills. *h* List price. *i* Plus Dominion and Province sales tax. *j* Increase due to all rail shipment route.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton f.o.b. 6 in. to 24 in.*a*	VITRIFIED SEWER PIPE Per foot, delivered std. 8 in., s.s.	std. 12 in., s.s.	ASTM C13-35 24 in.,	36 in.,	CLAY DRAIN TILE Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	CONCRETE SEWER PIPE Per ft., delivered; ASTM C 14-35 12 in.	24 in.	WROUGHT STEEL PIPE Full standard weight, *k* 1 to 3 in., Butt Weld Black %	Galv. %	3½ to 6 in.; Lap Weld Black %	Galv. %
Atlanta	$49.40	$0.26*b*	$0.468*bc*	$1.8525	$4.68*c*	$85.00	$128.00	$0.45	$1.642	48.2	34.2	39.7	21.2
Baltimore	52.80	.35	.60	2.50	7.10	150.00	200.00	.45	1.60	65.5	37.5	63.0	34.5
Birmingham	45.00	.275	.495	1.95	5.50	100.00	220.00	.40	1.60	62.2	34.2	59.7	31.2
Boston	55.00	.35	.70	2.35	.....	140.00	.....	.70	.....	64.1	36.1	61.6	33.1
Chicago	53.80	.28	.54	2.25	6.25	100.00‡	150.00‡	.38	1.50	67.0	39.0	63.5	35.0
Cincinnati	52.70	.231	.4455	1.80	5.125	105.00	170.00	.60	1.70	65.9	37.9	63.4	34.9
Cleveland	54.24	.203	.3915	1.665	5.125	81.00	125.00	.38	1.60	67.8	39.8	65.3	36.8
Dallas	58.20	.305	.549	2.25	5.00	90.00	110.00	.46	1.57	59.9	31.9	57.3	28.3
Denver	60.60	.24†	.52†	2.16†	.....	130.00	240.00	.....	.....	58.4	30.4	55.7	27.2
Detroit	54.24	.245	.4725	1.935	4.60	82.50	131.25	.35	1.50	66.3	38.3	63.8	35.3
Kansas City	55.12	.315	.59	2.20	5.86	140.00	260.00	.45	1.60	62.9	34.9	60.0	31.5
Los Angeles	55.00	.282†	.508†	2.034†	5.085†	115.50	192.50	1.00	2.00	59.6	31.6	57.0	28.6
Minneapolis	59.00	.275†	.495†	1.98†	5.14†	.....	.....	.77	1.98	64.2	36.2	60.7	32.2
Montreal	60.00	.55	.90	3.68	5.95*e*	135.00‡*l*	260.00‡*l*	.48*m*	1.92*m*	.....	.....	.....	.....
New Orleans	51.38	.26	.48	1.69	.....	150.00	220.00	.40	2.10	62.4	54.4	58.8	50.3
New York	52.20	.455	.8775	2.925	7.65	.....	.....	.50	1.20	64.9	56.8	62.4	53.9
Philadelphia	.....	.28	.54	2.30	6.75	150.00	225.00	.45	1.75	56.4	42.6	53.3	38.9
Pittsburgh	55.60	.245†	.4725†	1.845†	5.4325	97.80	154.20	.85*g*	2.00*g*	68.5*n*	57.5*i*	66.0*i*	54.5
St. Louis	52.48	.28	.504	2.016	4.50	85.00	220.00	1.10*j*	1.80*k*	56.4	42.6	52.5	38.9
San Francisco	58.00	.3625*d*	.6525*d*	2.61	6.52	115.50	192.50	.54	2.75	45.0	31.0	47.0	34.5
Seattle	55.35	.375	.675	2.70	6.75	84.00	187.50	.45*f*	1.40*f*	.....	.....	.....	.....

‡ Delivered. † F.o.b. *a* B. & S. class B and heavier, C/L lots, 200 tons and over Burlington, N.J. (base) $49.00. Based on existing freight rates; subject to rate change. Gas pipe and class A, $3 per ton additional, 4 in., $3 per ton additional, 30 in. and larger usually $2 per ton less. *b* Double strength. *c* List to dealer. *d* List. *e* 30-inch. *f* Less 5% for cash. *g* Culvert pipe. *h* Discounts from standard list consumers carload prices, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.: ¾ in., 8½c.; ¾ in., 11½c.; 1 in., 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92. *i* Applies also at Lorain, Ohio, mills. Chicago delivered base is 2½ points less on butt, 1½ on lap. Freight is figured from Pittsburgh, Lorain, O., Chicago Dist. Billing is from point producing lowest price at destination. WROUGHT IRON PIPE: Base price and list prices per ft. same as wrought steel pipe. Discount for Pittsburgh base: Butt-weld—1 in. and 1¼ in. black 34, galv. 16; 1½ in. black 38, galv. 18½; 2 in. black 37½, galv. 18. Lapweld—2½ in. to 3½ in. black 31½, galv. 14½ in.; 4½ in. to 8 in. black, 32½ galv. 17. *j* Reinforced; spec. C 76-37. *k* Reinforced; spec. C 75-37. *l* Plus sales tax. *m* Tax included.

NINE VOLUMES OF IMAGINEERING

THESE NINE BOOKS are designed to help all men, everywhere, do the Imagineering that improves methods of production and speeds delivery to our fighting men of all war materiel made of aluminum.

HERE AT ALCOA, Imagineering has enabled us to double production and to be well on the way to tripling it, in an amazingly short time. And still the expansion goes on. Swinging immense new plants into top volume at top speed;

building again, and manning that new capacity efficiently . . . This is Imagineering at work for the war.

WE'RE BREAKING RECORDS by sheer determination backed by know-how.

YOU'RE DOING THE SAME. Perhaps your men, many of them new to the ways of working with aluminum, can help you get even more speed through the know-how these books contain.

IN THE DAYS when we made only a driblet of Alcoa Aluminum Alloys, compared to the great flood we are now pouring into the war effort, our engineers could counsel with you personally on fabricating procedures. Today many of these men have been brought back to our plants to join the drive for production. From these books you can get much of the know-how our men used to bring you personally.

OUT OF THESE PAGES, too, will come the exciting Imagineering of the future. Many of the products you will create to meet the new competition, *as well as* millions of jobs for our boys as they come home, will stem from that Imagineering.

Aluminum Company of America, 2108 Gulf Building, Pittsburgh, Pennsylvania.

★ SO MUCH SO SOON ★

ALCOA ALUMINUM

ALCOA

"Tell me, pretty maiden, are there any more at home like you?"

That depends—depends urgently, upon the supply of steel on hand among the makers of these big guns. And, thanks to the ever-growing number of builders and contractors using Richmond's form-tying devices, more steel is being made available for these armaments so vital to our National Victory. Because, as compared, for instance, with "make-shift", "home-made" wire, band or rod ties fabricated on the job—

RICHMOND MAKES 1 TON OF STEEL DO THE WORK OF 3 TONS

—with specific advantages, that make Richmond form-tying devices and accessories the most economical to use. The "Richmond Way" is the profit-making way, in concrete form work, due to three outstanding features. **First,** a complete line of more than 85 different form-tying devices, specifically engineered for different jobs. **Second,** a free technical and estimating service that saves many hours of weary work by providing completely detailed plans and data especially for your job. **Third,** an immediate and substantial cash saving in not having to buy working parts, such as Tylags, Tycones, Flat Washers, Tywrenches, etc. Richmond loans them to you! Every builder and contractor who, today, turns to Richmond contributes two tons of steel to National Victory for every ton of Richmond's form-tying devices he uses. The job goes faster. The cost is less. The profit is larger. We welcome any opportunity to provide figures that establish these facts.

We Sell All Types...We Recommend Only Prefabricated Ties...They Cost Less!

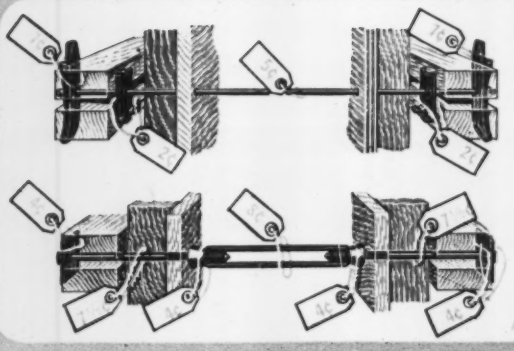
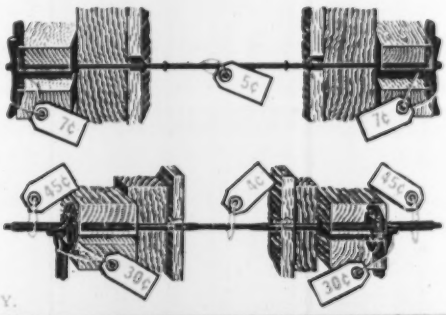


Figure it for yourself!
HERE ARE THE PRICES*



*BASED ON A 12" CONCRETE WALL

ALL PRICES F. O. B. BROOKLYN, N. Y.

RICHMOND SCREW ANCHOR CO., INC.

816-838 LIBERTY AVENUE • BROOKLYN, N. Y.

TIME AND LABOR SAVING CONSTRUCTION DEVICES FOR CONCRETE CONSTRUCTION

LUMBER, TIMBER PLYWOOD—PER M FT., B.M., CARLOAD LOTS F.O.B.

	SHORT LEAF YELLOW PINE AND DOUGLAS FIR — All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face) — All Fir planks No. 2 common, Fir timber is No. 1 common. Lengths up to 20 ft. (Prices in italics)									LONG LEAF Y. P. Merchantable grade up to 20 ft.		PLYWOOD Rail freight increment (See note for base price)	
	1x6 S4S	1x8 S4S	2x4 S4S	2x6 S4S	2x8 S4S	2x10 S4S	3x12 Rgh	6x12 Rgh	12x12 Rgh	2x12 Rgh	12x12 Rgh	⅜"	¾"
Atlanta	**$28.00**	**$28.00**	**$29.00**	**$27.00**	**$28.00**	**$29.50**	**$44.00**			$60.00	$70.00	$17.90	$21.85
Baltimore	**40.00**	**41.00**	**41.00**	**39.00**	**39.00**	**41.00**	**56.00**			90.00	95.00	18.25	22.25
	45.00	*45.00*	*46.00*	*46.00*	*46.00*	*48.00*	*58.00*	*$80.00*	*$60.00*				
Birmingham	**34.50**	**34.50**	**32.00**	**32.00**	**32.00**	**34.00**	**53.00**	**53.00**	**56.00**			17.35	21.15
[1]	37.50	37.50	37.00	37.00	37.00	43.00	65.00			67.50	70.00		
Boston	38.00[2]	38.00[2]	50.00[3]	50.00	75.00[3]	85.00[3]	95.00[3]			95.00	105.00	18.25	22.25
	38.00	*38.00*	*50.00*	*50.00*	*50.00*	*50.00*	*75.00*	*75.00*	*75.00*				
Chicago	**43.00**	**44.00**	**43.00**	**43.00**	**44.00**	**46.00**	**53.00**			90.00	100.00	14.60	17.80
	46.00	*46.00*	*46.00*	*44.00*	*46.00*	*48.00*	*50.00*	*55.00*	*55.00*				
Cincinnati	**41.00**	**42.50**	**39.00**	**40.50**	**42.00**	**43.00**	**53.00**			65.00	68.00	17.35	21.15
							55.50	*55.50*	*55.50*				
Cleveland	**42.50**	**42.50**	**41.50**	**43.50**	**45.00**	**48.00**	**53.00**	*57.00*	*57.00*	90.00	90.00	17.75	21.60
Dallas	**39.50**	**40.50**	**39.50**	**38.00**	**38.50**	**39.50**	**53.00**	**53.00**	**53.00**	78.00	83.00	14.60	17.80
Denver [‡]	54.00[4]	52.00[4]	55.00[4]	55.00[4]	55.00[4]	56.00[4]	59.00[4]	*75.00*	*79.00*			10.45	12.70
Detroit	**46.00**	**46.00**	**46.00**	**46.00**	**46.00**	**48.00**	**53.00**			53.00	61.50	17.35	21.15
						51.50	*54.00*	*60.00*	*60.00*				
Kansas City	**42.50**	**45.00**	**42.00**	**42.00**	**42.00**	**45.00**	**57.50**			70.00	75.00	12.60	15.40
	47.50	*47.50*	*47.50*	*47.50*	*47.50*	*50.00*	*57.50*	*75.00*	*75.00*				
Los Angeles [a]	*55.00*	*55.00*	*53.00*	*53.00*	*51.00*	*51.00*	*57.00*	*65.00*	*56.00*			9.90/*h*	12.05/*h*
Minneapolis [‡b]	49.00[6]	49.00[6]										12.60	15.40
[‡]	*53.00*	*53.00*	*53.00*	*52.00*	*52.00*	*53.00*	*59.00*	*61.00*	*61.00*				
Montreal [†]	*45.00*	*46.00*	*42.00*	*45.00*	*47.00*	*54.00*				200.00	200.00		
	42.25	*42.25*	*42.00*	*44.00*	*44.00*	*45.75*	*50.25*	*50.25*	*50.25*				
New Orleans	**31.50**	**31.50**	**33.75**	**31.75**	**34.00**	**35.00**	**48.00**			69.00	69.00	14.60	17.80
	31.00	*31.00*	*33.00*	*31.00*	*34.00*	*32.00*	*33.00*						
New York [‡]	**48.00**	**49.00**	**49.00**	**50.00**	**51.00**	**54.00**	**62.00**			120.00/*f*	125.00/*f*	18.35	22.25
[‡]			*65.00*	*65.00*	*65.00*	*65.00*	*67.50*	*75.00*	*75.00*				
Philadelphia	**43.00**	**44.00**	**43.00**	**43.00**	**44.00**	**47.00**	**49.00**			75.00	80.00	18.25	22.25
	47.00	*47.00*	*47.00*	*47.00*	*45.50*	*46.25*	*56.00*	*56.00*	*56.00*				
Pittsburgh	**50.80**	**53.20**	**62.75**	**55.00**	**60.85**	**62.50**	**76.25**					18.10	22.05
	69.20	*68.10*	*66.10*	*65.30*	*65.20*	*65.65*	*88.75*	*88.75*	*88.75*				
St. Louis [‡c]	**45.00**	**46.50**	**44.50**	**42.50**	**43.50**	**45.00**	**59.00**	*67.50*	*67.50*	78.00	66.00	14.60	17.80
San Francisco [d]	*35.50*	*35.50*	*38.00*	*38.00*	*37.50*	*37.50*	*43.00*	*43.00*	*43.00*			7.30/*i*	8.90/*i*
Seattle	*35.00*	*35.00*	*35.00*	*35.00*	*35.00*	*35.00*	*40.00*	*40.00*	*40.00*			0.00	0.00

Bold Face type, Southern Pine. *Italics, Douglas Fir.* [1] Long leaf. [2] Roofers' N. C. Pine. [3] Spruce. [4] Native. [5] Western Pine, No. 3 Common. [7] Spruce [8] Norway Pine. ‡ Delivered. *a* Yard prices. *b* Contractors discount in Minneapolis and St. Paul discontinued May 21, 1938. *c* 5M ft. or less. *d* F.o.b. cars San Francisco freight rate. *e* 10% discount taken off. *f* Up to 18 ft. † Plus sales tax.

NOTE: Special concrete form grade Fir Plywood, 4' by 8' panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on ⅜", $86.50; on ¾", $95.30; price includes oiling and sealing charges. For other centers add rail freight increment from table or proper size. For resin dipped treatment, add $10.50 per M. *g* Lower rate by water shipment. *h* 50,000 lb. minimum.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS — Discounts from jobbers list, Aug. 15, 1938 — Single or Double Thickness		EXPLOSIVES — Per lb. 40% Ammonia Gelatin in 50-lb. cases delivered in 200 lb. lots*
	A quality	B quality	
Atlanta	75%	75%	$0.15
Baltimore	79%	80%	.15
Birmingham	76%	76%	.105
Boston	77%	78%	.15
Chicago	79%	79%	.15
Cincinnati	77-10%	77-10%	.15
Cleveland	77%	77%	.19
Dallas	78%	78%	.1625
Denver	76%	76%	.155*e*
Detroit	79%	79%	.15
Kansas City	76-10%	76-10%	.155
Los Angeles	86%*d*	88%*d*	.1575
Minneapolis	76%	76%	.155
Montreal	40-5%‡	47%‡	.1675†
New Orleans	70%	75%	.16
New York	81%	82%	.22*f*
Philadelphia	78%	79%	.15
Pittsburgh	79%	79%	.1225
St. Louis	76-10%	76-10%	.155
San Francisco	78%	80%	.155
Seattle	75%	76%	.1575†

Price of 60% Ammonia Gelatin in $0.01 per lb. higher than 40%

a Disc. from list Sept. 1939. *b* Also less 6% tax exemption. *d* Discount from jobbers' list Sept. 15, 1928. ‡ Plus sales tax.

* Urban prices influenced by service charges or local storage and delivery regulations, do not consistently reflect quantity prices in less congested areas. *e* F.o.b. Louviers, Colo. *f* In boroughs of Kings, Queens and Richmond, and in Manhattan south of Canal Street, add delivery charge of $6.00 per trip. † F.o.b.

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me.	$0.105	$0.13	$0.15
W. of Miss. to Rocky Mtn. States, Fla. and Maine	.11 -.1175	.135 -.1475	.155 -.1675
Rocky Mtn. States	.11 -.1225	.135 -.1525‡	.155 -.1725‡
Pacific N. W. States	.1075-.12	.1375-.15	.1575-.17
Pacific S. W. States	.1050-.1125	.135 -.1425	.155 -.1625

[1] ‡ F.o.b. Louviers, Colo., or Butte, Mont.

PILES, TIES—F.O.B.

PILES

Prices per linear foot, pine, with bark on, f.o.b. New York; delivered from barge 1¢ to 2¢ per ft. additional:

Dimensions	Points	Length	Short Leaf—Barge	Short Leaf—Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.23	$0.25
12 in.—2 ft. from butt	6 in.	50 to 59 ft.	.26	.28
12 in.—2 ft. from butt	6 in.	60 to 69 ft.	.27	.29
14 in.—2 ft. from butt	6 in.	50 to 69 ft.	.28	.29
14 in.—2 ft. from butt	6 in.	70 to 79 ft.	.31	.33
14 in.—2 ft. from butt	5 in.	80 to 85 ft.	.40	.44
14 in.—2 ft. from butt	5 in.	85 to 89 ft.	.45	.482

RAILWAY TIES

Prices f.o.b., per tie for carload lots:		6"x8"x8' Untr.	6"x8"x8' Tr.	7"x9"x8'6" Untr.	7"x9"x8'6" Tr.
Boston	Oak	$1.30		$1.80	
	Pine	1.60	$2.40*a*	2.40	$3.40*a*
New York	S. L. Sap Pine	1.30	1.40	2.35	1.60 2.60
	Mixed Oak		1.55	2.35	2.00 2.95
Birmingham	White Oak	1.00	1.60*a*	1.30	2.25*a*
	Southern Pine	....	....	....	....
Chicago	Red Oak	....	2.05*a*	....	2.70*a*
	Southern Pine	....	....	....	....
Los Angeles	Douglas Fir	1.10	1.75*a*	1.60	2.50*a*
Philadelphia	Red Oak	....	2.10*a*	....	3.25*a*
St. Louis	White Oak	1.65	....	1.90	....
	Red Oak	1.55	2.15*a*	1.90	2.70*a*
	Sap Pine or Cypress	1.45	....	1.80	....
San Francisco	Douglas Fir	1.25*b-f*	....	....	3.00*c-f*
Montreal	Birch or Maple	.85	†	.95	†

Tr.—Treated; Untr.—Untreated. *a* Creosoted. *b* 6" x 8" x 8'6". *c* Empty cell. *d* Zinc. *e* Green. *f* At ships tackle. † Out of market.

CHEMICALS

Water, sewage treatment road work, f.o.b. carlots, New York

Bleaching powder, in drums, f.o.b. works, per 100-lb	$2.25- 3.10
Chlorine cylinders, liquid, per lb. delivered	0525
Calcium chloride, 77-80%, flaked, in 400-lb. drums or 100-lb. paper bags, delivered, per ton	18.50-35.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb	1.40
Soda ash, 58%, in paper bags, per 100 lb. dense	1.15
Sulphate of aluminum, commercial, in 100-lb. bags, per ton	23.00-25.00
Sulphate of copper, in bbl., per 100-lb	5.15- 5.50

Save Time by specifying Jenkins Valves...for Replacements...New Installations!

MOST VALVES in service today were installed for peacetime service. They simply weren't designed to stand the gaff of all out war production.

Take care of them. Make them last as long as possible. But when they do give out, ward against future lost time by replacing with valves that can meet extraordinary demands!

Jenkins Valves have always been made with an extra quality margin to stand up under *punishing* service, for *extended* periods. This has been proved time and again . . . in plant after plant . . . year after year.

For replacements, for new installations, specify Jenkins Valves to avoid work interruptions caused by valve failure . . . to reduce maintenance time and labor. They cost no more to buy: cost less to use! Available quickly . . . carried in stock by good supply houses everywhere!

Jenkins Bros., 80 White Street, New York, N. Y.; Bridgeport, Conn.; Atlanta, Ga.; Boston, Mass.; Philadelphia, Pa.; Chicago, Ill.; Houston, Texas; Jenkins Bros., Limited, Montreal; London, England

JENKINS VALVES

For every industrial, engineering, marine and power plant service . . . in Bronze, Iron, Cast Steel and Corrosion-Resisting Alloys . . . 125 to 600 lbs. pressure.

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE — PARTITION — SCORED Per M. lots of 2,000 pieces or over,			STRUCTURAL CLAY TILE — LOAD BEARING — SCORED Per M. lots of 2,000 pieces or over,			BRICK Per M. in quantity,		LIME		
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Per ton, Hydrated finishing	In paper, Common hydrated	Carload lot, Pulverized or lump
Atlanta	$100.00	$110.00	$195.00	$230.00	$240.00	$240.00	$13.50	$18.00	$26.50	$15.00	$15.00
Baltimore	82.00	88.00	165.00	195.00	260.00	320.00	14.00*k*	17.00*k*	18.00	12.00	2.50*m*
Birmingham	80.00	85.00	160.00	191.00	252.00	288.00	14.50	17.00	18.11	13.64	2.25*lo*
Boston	88.40*u*	94.30*u*	176.90*u*	200.40	260.90	325.00	18.00*i*	21.00*i*	21.00	15.00	16.00
Chicago	68.10	72.60	135.90	185.70	234.90	268.10	12.00	14.00	17.00	15.00	12.50
Cincinnati	65.55	69.90	131.20	148.70	210.35	240.45	17.50	17.50	15.40	12.90	.....
Cleveland	60.00	64.00	120.00	144.00	193.00	221.00	17.00	17.00	14.50*j*	13.25*j*	3.00*jm*
Dallas	52.00	54.00	100.00	135.00	200.00	263.00	11.50*i*	13.50*i*	19.00	15.00	.95*n*
Denver	84.80	94.40	152.70	178.20	212.00	227.90	13.50	17.00	30.00*j*	19.00*j*	30.00*j*
Detroit	78.20	86.40	159.60	203.00	263.50	301.00*e*	17.50	18.00	16.50	13.90	14.90
Kansas City	67.00	69.00	89.00*c*	128.00	163.00	189.00	16.00	24.00	19.32	13.00	10.92
Los Angeles	73.50*tr*	89.50*tr*	128.00*c tr*	210.00*tr*	368.00*tr*	460.00*tr*	13.50	15.00	16.50	17.50	17.50
Minneapolis	81.00*b*	86.40*b*	146.90*b*		177.00*b*	246.00*b*	13.60	15.60*j*	21.00	16.00	19.00
Montreal	72.20*tu*	77.50*tu*	142.50*tu*	76.00*tu*	165.80*tu*	248.70*u*	22.00*tu*	27.10*tu*	23.50*u*	17.00*u*	12.00*u*
New Orleans	72.00	72.00	135.00	162.00	210.00	260.00	14.00	.....	18.30	12.08	14.10
New York	78.40	83.60	115.00*c*	193.30*h*	238.80*h*	295.60*h*	13.50	.....	20.00	14.00	17.00
Philadelphia	90.00	97.70	183.20	197.10	243.20	301.10	17.00*s*	20.00*s*	15.50*q*	8.55*q*	10.55*q*
Pittsburgh	62.35	66.55	124.75	140.25	173.25	198.00	17.50	19.50	17.90	15.40	2.55*m*
St. Louis	62.00	88.00	120.00	180.00	234.00	280.00	17.00	18.00	22.00	18.00	18.00
San Francisco	84.00	94.50	225.00	.....	.....	.....	17.50	22.00	20.00	20.00	16.40
Seattle	105.00	115.00	210.00	.....	.....	.....	19.50*f*	20.50*f*	20.00*s*	20.00*s*	20.00*s*

† F.o.b. *a* Smooth. *b* Carload lots delivered to job. *c* 6x12x12 in. *d* Not load bearing. *e* 48 lb. tile. *f* Less $1.00. *j* cash 15 days, balance 30 days. *g* Selected common. *h* F.o.b. Perth Amboy, N. J. *i* 50c. per M off for cash. *j* LCL. *k* $1.00 discount if paid in 10 days. *l* Lump. *m* Per bbl., 180 lb. *n* Per sack 100 lb. *o* Per bbl., 200 lb. *p* 280 lb. bag. *q* 25-ton cars. *r* 5% discount 10 days. *s* 2% off cash. *t* 5½x8x12. *u* Plus 8% sales tax.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

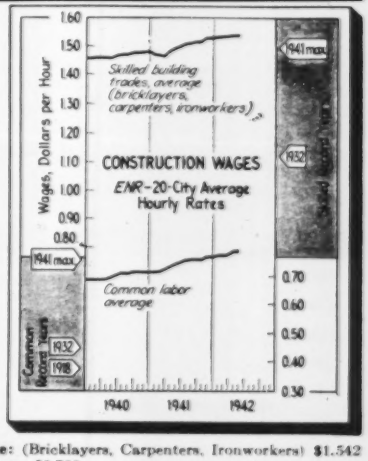
	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl. Dry *a*	WHITE LEAD Per 100 lb. in oil	READY-MIXED PAINT Per gal., drums Graphite *b*	Aluminum *b*	Ferric Oxide *d*	ROOFING SUPPLIES Carload lots f.o.b. factory Rolls, slate surfaced, 85–90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal	Tar pitch 350 lb. bbl. per ton
Atlanta	$10.25	$14.125	$1.30	$2.25	$1.20	$1.90	$1.61	$1.61	$0.27	$29.00
Baltimore	10.00	13.75	1.95	2.90	2.50	2.20	2.60	2.60	.40	30.00
Birmingham	10.25	14.125	2.35	3.50*r*	1.98*r*	2.04	1.97	1.97	.32	28.35
Boston	10.00	13.75	2.70‡	3.65‡	2.50‡	1.90‡	1.90*h*‡	1.90*h*‡	.50‡	20.00‡
Chicago	10.00	13.75	2.11	2.63	1.72	1.60*h*/	1.60*h*/	1.60*h*/	.28/	22.00/
Cincinnati	10.00	13.75	1.70	2.90	1.60	2.40	2.39*h*	2.39*h*	.36	21.00
Cleveland	10.00	13.75	2.90	4.80	2.30	1.93	1.83*h*	1.83*h*	.40	25.00
Dallas	10.00	14.50	1.88	2.11*n*	.....	2.30*h*	2.25*h*	2.45*h*	.35	39.00
Denver	10.50	14.25	1.65	2.60	.27*l*	2.45	3.15	3.15	.35	28.00
Detroit	10.00	13.75	1.75	3.00	1.60	2.40	2.50	2.50	.35	21.00
Kansas City	10.00	13.875	2.39*g*	2.55*gr*	2.16*gn*	2.10	2.30	2.30	.28	27.50
Los Angeles	10.25	14.25	1.60	2.25	2.30	2.10	1.50	.....	.45	.....
Minneapolis	10.00	13.875	.....	.....	.....	1.75*i*	1.66*hi*	1.66*hi*	.32	23.00
Montreal	9.25	11.07	2.40*p*	2.97*p*	2.51*p*	2.85	2.58	2.01	.63	1.85*k*
New York	10.00	13.75	2.05	2.55	1.64	1.66	1.58*h*	1.58*h*	.26	25.00
Philadelphia	10.00	13.75	.....	.....	.....	1.75	1.66	1.66	.32	23.00
Pittsburgh	10.00	13.75	1.05	1.95	.80	1.95	1.94*h*	1.94*h*	.34	26.00
St. Louis	10.00	13.75	1.90/2.00	2.60/2.80	1.60/2.00	1.75	1.66	1.66	.34	24.00
San Francisco	10.25	14.00	1.80	2.75*n*	1.10/2.00	1.89	2.66	2.66	.33	19.50
Seattle	10.25	14.25	1.90	3.00	.....	2.15	2.16*h*	.....	.35	26.50*j*

‡ Delivered. Note: Red lead in oil 50c. higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price changes. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266-31. *d* 80% minimum ferric oxide. *e* Subject to 25% discount. *f* Distributors' price to contractors. *g* 5 gal. can *h* Per roll, 65 lb. *i* Minneapolis and vicinity. *j* Asphalt pitch. *k* Per 100 lb. *l* Per lb. *m* Per bbl. *n* May, 1941 price, no later quotation available. *p* Plus 8% sales tax. *r* Not available, except on priority rating; then quoted specially.

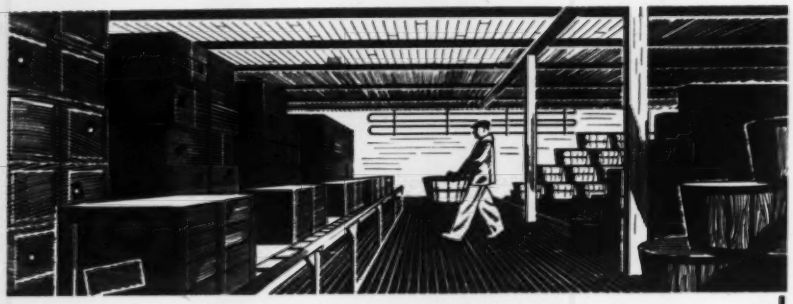
SKILLED AND COMMON WAGE RATES—PER HOUR

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Common Labor Building	Common Labor Heavy Const.
Atlanta	$1.375	$1.00	$1.375	$1.00/1.25	$1.25	$0.40	$0.50
Baltimore	1.625	1.375	1.65	1.65	1.50	.70	.70
Birmingham	1.75	1.125/1.25	1.50	1.25/1.50	1.50	.65	.65
Boston	1.50	1.375	1.50	1.875	1.625	.85	.85
Chicago	1.70	1.625	1.70	1.70	1.825	1.025	1.025
Cincinnati	1.75	1.50	1.625	1.40/1.55	1.625	.80	.80
Cleveland	1.75	1.50	1.75	1.75	1.75	1.00	1.00
Dallas	1.50	1.00	1.25	1.00	1.50	.50/.625	.50/.625
Denver	1.65*b*	1.43*b*	1.43*b*	1.43*b*	1.51*b*	.718*b*	.718*b*
Detroit	1.60	1.40	1.75	1.625	1.675	.80	.80
Kansas City	1.625	1.375	1.50	1.50	1.575	.85	.50
Los Angeles	1.50	1.175	1.50	1.50	1.667	.75	.75
Minneapolis	1.50	1.25	1.50	1.40	1.50*c*	.90	.90
New Orleans	1.50	1.25	1.50	1.375	1.375	.60	.60
New York	2.00*b*	1.85*b*	2.00	2.00*b*	2.00*c*	1.031	.95
Philadelphia	1.825	1.50	1.80	1.65	1.8775	.775	.775
Pittsburgh	1.90	1.50	1.75	1.5625/1.625	1.75	.80	.70
St. Louis	1.25/1.50	1.50	1.75	1.50/2.00	1.25/1.75	.675/.875	.875
San Francisco	1.75*c*	1.375	1.60	1.50	1.667*c*	.875	.875
Seattle	1.715	1.415	1.615	1.565	1.715	1.015	1.10
Montreal	.965	.855	.87	.76	.945	.505	.505

b 7 hr. day. *c* 6 hr. day. *d* 35 hr. wk. *e* 30 hr. wk.



ENR Skilled Average: (Bricklayers, Carpenters, Ironworkers) $1.542
ENR Common Average: $0.788



Cold Storage Plants Offer Hot Tip On Wood Construction

WOLMANIZED LUMBER* adds long life to the other advantages of wood construction; that's the verdict of cold storage and ice plant operators after observing its fine performance for the past fourteen years. They've used hundreds of thousands of feet of Wolmanized Lumber for cold-room floors, framing and linings.

WOOD CONSTRUCTION puts cold storage within reach of many fruit and vegetable growers, by cutting the initial cost of these plants. Wolmanized Lumber assures low upkeep costs, because this wood is able to withstand the high humidities encountered. Its insulating properties give added operating economies.

WOLMANIZED LUMBER is ordinary lumber which has been made resistant to decay and termite attack by vacuum-pressure impregnation with Wolman Salts* preservative. It adds little to the first cost of a structure—is light, strong, resilient. It goes up quickly and easily and is clean, odorless and paintable.

HAVE YOU A PROBLEM which might be solved with Wolmanized Lumber? We'll gladly send you additional data on its use. Write American Lumber & Treating Company, 1649 McCormick Building, Chicago, Illinois.

*Registered Trade Mark

WOLMANIZED LUMBER

WOLMANIZED

Miscellaneous Notes on Booklets and Reprints

(*Continued from p. 96*)

detail. Earlier publications of the Forest Service on this subject are "Roadside Attractiveness" and a chapter on erosion control in the "Truck Trail Handbook." Copies may be obtained from the U. S. Forest Service, South Building, Washington, D. C.

TENTATIVE SPECIFICATIONS for the design, fabrication and erection of structural steel for buildings by arc and gas welding have been issued by the American Institute of Steel Construction, 101 Park Ave., New York. (Price 25c.). These are in harmony with the tentative specifications of the American Welding Society and were prepared by the institute's committee on specifications to provide complete specifications in the welding field comparable to the institute's specifications for riveted construction.

TO MEET REPEATED ATTACKS on the federal-aid principle of highway building, "stemming from high federal official sources," the National Highway Users Conference has issued a pamphlet entitled "Save the Federal-Aid Highway Principle." Copies can be obtained from the conference headquarters, National Press Bldg., Washington, on application.

New Engineering Books

DU PONT ONE HUNDRED AND FORTY YEARS —William S. Dutton. 377 pp. Charles Scribner's Sons, New York. Price $3.

AN ENGINEER IN THE ORIENT—R. W. Lawton. 201 pp. Walton & Wright, Granada Press, Los Angeles, Calif. Price $2.

SCIENTISTS FACE THE WORLD OF 1942—Karl T. Compton, Robert W. Trullinger, Vannevar Bush. 80 pp. Rutgers University Press, New Brunswick, N. J. Price $1.25.

WHAT THE CITIZEN SHOULD KNOW ABOUT THE ARMY ENGINEERS—Lt. Col. Paul W. Thompson. 204 pp. W. W. Norton & Co., Inc., New York. Price $2.50.

PUBLIC WORKS ENGINEERS' YEARBOOK 1942 —381 pp. American Public Works Association, Chicago. Price $3.50.

FLUORESCENT LIGHTING MANUAL—Charles

THEY'RE IN THE ARMY

This letter tells why -- and why you should use them both before and after Victory.

View of wagon drill in limestone quarry which supplies 5,000 tons per day for the construction work at Fort Knox.

TO ASSURE VICTORY
BUY UNITED STATES DEFENSE BONDS & STAMPS

March 17, 1942

The Timken Roller Bearing Co.,
Canton, Ohio.

Gentlemen:

You may be interested in knowing that we have used Timken Rock Bits exclusively for the past four years, with a decided saving in expense, both in bit consumption and time, due to their evident superior construction and material.

Daily production is 5,000 tons of various size crushed stone aggregate used in construction activities at Fort Knox, Kentucky.

In that the shoulder design of the Timken Bit takes the shock of the hammer stroke, we have no trouble in removing used bits from the drill steel, thusly eliminating trouble previously experienced.

In conclusion will say that a general saving has been noticed throughout the operation such as air consumption, steel breakage, bit breakage and have increased our production considerably without any noticeable increase in bit consumption.

Yours very truly,

Taylor E. Huff,
Chief Operations Eng.,
& Supt. Quarry Operations.
Fort Knox, Kentucky.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN

REG. U. S. PAT. OFF.

ROCK BITS

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

Use R B & W Bolts and Nuts . . .

Quick-starting, quick-tightening because they are accurately, uniformly sized and threaded — and carefully inspected.

Vibration-resisting, shock-resisting because the manufacturing method insures extra strength, and all processing is controlled from raw rod to finished product.

EMPIRE BOLTS-NUTS AND ALLIED FASTENING PRODUCTS . . . SINCE 1845

RB&W *Making strong the things that make America strong*

Russell, Burdsall & Ward Bolt and Nut Company. *Factories at* Port Chester, N. Y., Rock Falls, Ill., Coraopolis, Pa.; *sales offices at* Philadelphia, Chicago, Detroit, Chattanooga, Los Angeles, San Francisco, Portland, Seattle

L. Amick. 312 pp. McGraw-Hill Book Co., New York and London. Price $3.

How to Read Electrical Blueprints—Gilbert M. Heine and Carl H. Dunlap. 318 pp. American Technical Society, Chicago, Ill. Price $3.

The Panama Canal in Peace and War—Norman J. Padelford, 314 pp. The Macmillan Co., New York. Price $3.

Reports and Pamphlets

Selective Use of Portland Cement—North American Cement Corp., Albany, N. Y.

Collapsing Pressure of Thin-Walled Cylinders—By Rolland G. Sturm. Engineering Experiment Station Bulletin Series No. 329. University of Illinois, Urbana. 80c.

Papers Presented at the Twenty-Eighth Annual Conference on Highway Engineering—University of Illinois, Engineering Experiment Station Circular Series No. 42. 50c.

Digest of State and Federal Labor Legislation—Bulletin No. 48, U. S. Dept. of Labor. Superintendent of Documents, Washington, D. C. 10c.

Antigonish (N. S.)—Annual report of town government 1941.

San Francisco Public Utilities Commission—Annual report 1941. San Francisco, Calif.

Mansfield, Mass.—Annual report of town officers 1941.

Province of Saskatchewan—Annual report of the Department of Highways and Transportation 1941.

Port of New York Authority—Twenty-first annual report, 1941. 111 Eighth Ave., New York.

American Institute of Consulting Engineers—Proceedings of Annual Meeting. Office of the Secretary, 75 West St., New York.

Priorities Instructions—Army and Navy Munitions Board, Washington, D. C.

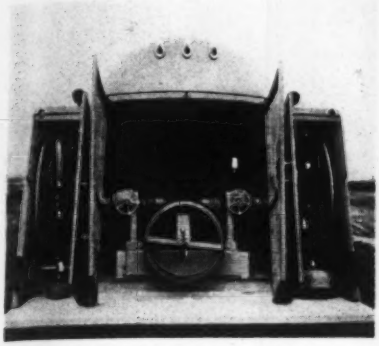
Post War Planning in the United States—By George B. Galloway. Twentieth Century Fund, New York. Price 60c.

TechniData Hand Book—By Edward Lupton Page. Norman W. Henley Publishing Co., New York. Price $1.

New Principles in Urban Transportation Economy — The transportation problem in the City of Buenos Aires. Second Revised Edition. Republica Argentina, Ministerio Del Interior, Transport Control Committee of Buenos Aires.

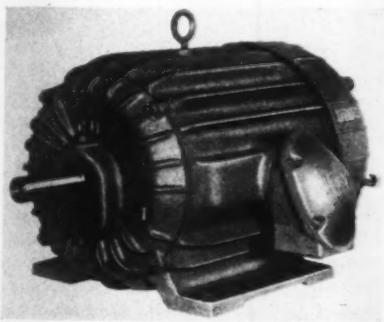
New Aids to the Constructor

Equipment and material announcements and manufacturers' news



Fire Truck

No sirens, bells or other gadgets adorn a modern fire truck manufactured under war time regulations by Cardox Corp. for civilian, industrial and military use. Equipped with a refrigerated tank that holds three tons of liquid carbon dioxide, this apparatus provides its own fire extinguishing medium. Since the liquid carbon dioxide is under pressure, the Cardox fire truck is independent of pumps, hose connections, water supplies or water mains that may be rendered useless by bombing. Each hose, mounted on a reel and equipped with nozzle and playpipe, has its own cabinet at the rear of the truck. The middle cabinet holds refrigerating unit to keep the liquid carbon dioxide at 0°F.—*The Cardox Co., 307 No. Michigan Ave., Chicago, Ill.*

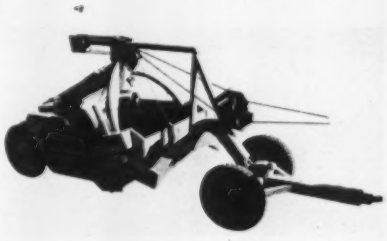


Inclosed Motor

The Crocker-Wheeler Electric Mfg. Co. has announced a new fan cooled motor called "Cowl-Cooled." This motor is especially adapted for use in dusty locations and for all applications where the conventional type of totally inclosed motor has previously been recommended. Because the ventilating air is blown over the external ribs, which run the length of the frame, and is not forced through internal passages, trouble-free operation is assured, even in atmospheres containing excess amounts of destructive fumes, abrasive dust, oil or dirt.—*Crocker Wheeler Electric Mfg. Co., Ampere, N. J.*

Diaphragm Pumps

New models of diaphragm pumps introduced by Construction Machinery Co. are said to have reached new highs of efficiency. The new pump, called the "wonder" pump, handles mud, sludge, seepage, sewage, etc. Exclusive features include full finished roller chain drive, cut tooth sprockets completely enclosed, improved type, long service basket weave diaphragm, and interusable suction, discharge and cleanout locations.—*Construction Machinery Co., Waterloo, Iowa.*



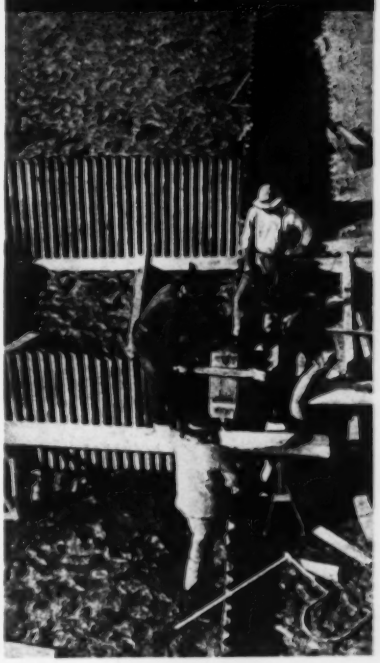
Carryall Model

To standardize and simplify its scraper line, R. G. LeTourneau, Inc., has announced the Model D carryall which will replace former models X and Z. The improved and newly designed small scraper has a struck capacity of 3.5 cu.yd. The model incorporates the same features of design and operation that are standard in all current larger carryall models. Major changes from the X and Z include stronger and heavier box type construction; overhead spring pipe; large carrying apron; elimination of throw-arm for raising and lowering blade and bowl.—*R. G. LeTourneau, Inc., Peoria, Ill.*

Filing Cabinets

The Hamilton Mfg. Co. has introduced a new line of wooden filing units for use in field and home offices. The new prod-

CORRUGATED



. . . DOES ITS SHARE

When the job calls for steel sheet piling get the facts about Corrugated. Learn how it can help you save time, labor, transportation, power, steel and money.

Lightweight, easy to handle, sometimes driven by hand, easy to stack, install, pull and transport, you save on man hours, on power and steel. Highly salvable, you can quickly and easily remove from one job to another. Thus the original cost spreads out to a minimum per job and effects a definite conservation of steel. Our catalog and specification book will show you how to use Corrugated economically and effectively, send for it.

CAINE STEEL CO.

1820 N. Central Ave., Chicago

STANDARD INTERLOCK

CAINE

ROLLED STEEL SHEET PILING

SMALL GASOLINE MOTORS HELP TO KEEP FIGHTING MEN

Fit!

• Military men state that cleanliness is a basic requirement—essential to morale and health. Mobile units—on which is mounted equipment powered by Briggs & Stratton gasoline motors, for heating water in volume — provide "showers" for men doing field service, and in temporary camps—also used to distill water for cooking and medical purposes — and as sterilizing and disinfecting units.

THE ENTIRE PRODUCTION FACILITIES of our Company are assigned to the war program. If your equipment is serving the army, navy or air forces of the United Nations, or is in an "accepted" essential industry — and you require gasoline motors in our range of from ⅔ to 6 H.P. — we will strive to serve you.

The service of over a million and a half Briggs & Stratton 4-cycle, air-cooled gasoline motors, produced to date, can be extended materially by proper care, and by periodical inspection for damaged or worn parts needing replacement. Equipment dealers and Authorized Service Stations everywhere are ready to help "keep 'em running."

BRIGGS & STRATTON CORP.
Milwaukee, Wisconsin, U. S. A.

uct is said to look like a steel unit, to interlock with steel units and to operate as do steel units. It is hailed as an answer to engineering departments faced with the wartime problems of fitting wood units into a blueprint filing cabinet which has been carefully built up on steel unit construction and interchangeability. The cabinets are styled and finished in the same olive green as standard steel units and interlock and stack with the standard line of 2436, 3012 and 3648 steel units.—*The Hamilton Mfg. Co., Two Rivers, Wis.*

Railroad Crane

A new 4 ton traveling railroad crane, designed to meet the pressing need for additional mechanical material handling equipment, has been brought out by the Insley Manufacturing Corp. The new crane weighs approximately 11 tons and has a traction drive on all four wheels. It is easy to handle and works speedily, is full revolving and swings at the unusually high speed of 5.9 r.p.m.—*Insley Mfg. Corp., Indianapolis, Ind.*

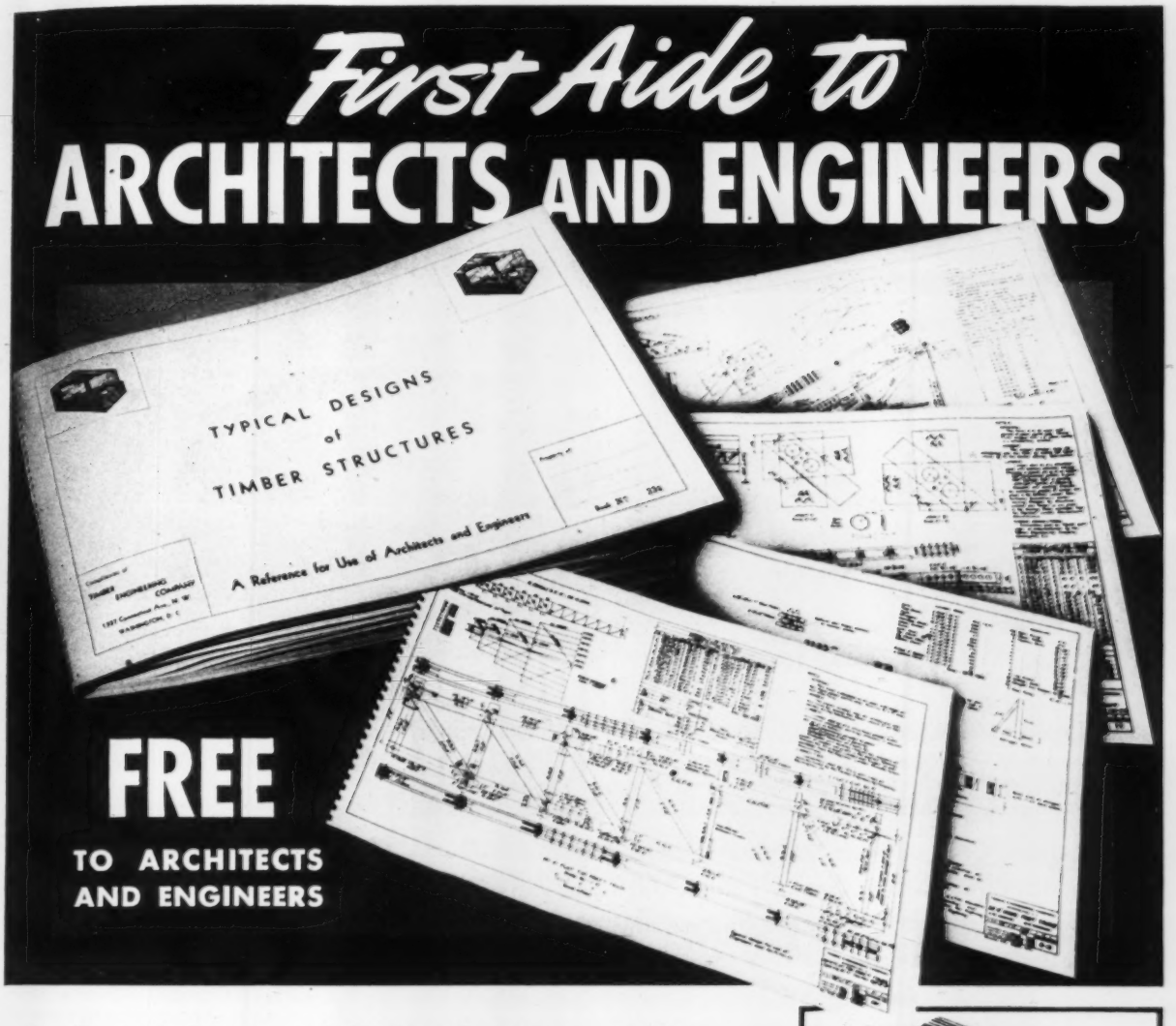
Concrete Spreader

A new model transverse blade concrete spreader for airport and road building, with width adjustments up to 5 ft., has been announced by the Blaw-Knox Co. By means of the adjustment, a 10 ft. spreader will extend to a maximum width of 15 ft., and a 20 ft. to a maximum width of 25 ft.—*Blaw-Knox Division of Blaw-Knox Co., Blawnox, Pa.*

Plastics Available

New Colonial "V" plastics are now ready for the market for both war and essential civilian needs, according to the Colonial Alloys Co. The materials that go into these plastics are now plentiful and readily obtainable. While priority certificates are not absolutely necessary in some cases, ratings of A-10 or better should accompany orders. These plastics have a wide range of uses as alternates

First Aide to ARCHITECTS AND ENGINEERS



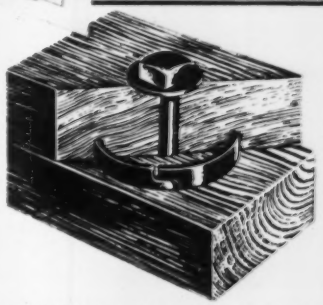
FREE

TO ARCHITECTS AND ENGINEERS

In *Typical Designs of Timber Structures* we have grouped the plans of 45 representative types of structures that have been engineered with TECO Connectors.

Among these drawings you will find helpful suggestions to answer design problems troubling you today. You will see how capably the TECO Connector System handles different types of timber structures . . . short-span trusses as well as longer ones.

This fine reference book is available . . . FREE . . . to any architect or engineer. Please write on your firm letterhead . . . or use the coupon below.



The TECO Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood . . . brings the full structural strength of lumber into play.

Timber ENGINEERING COMPANY, INC.

1337 Connecticut Ave., N. W., Washington, D. C.

Timber Engineering Company, Inc.
Room 101, 1337 Connecticut Avenue,
Washington, D. C.

Gentlemen:

As yet I haven't received *Typical Designs of Timber Structures*. Please rush my copy.

Name.....

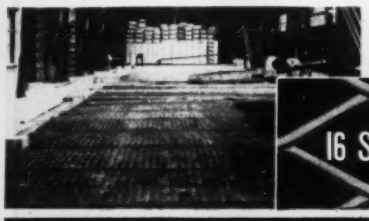
Firm.....

Address.....

Saves TIME and MAN-HOURS
ON CONCRETE CONSTRUCTION FOR DEFENSE

Our front lines will get tanks, planes, ships and guns in proportion to our *efficient* use of Steel and Man-Power on our industrial fronts. Use Reinforced Concrete for *Permanency*, and Steelcrete Expanded Metal Reinforcing Mesh for *Simplicity* and *Economy*. There's a *labor-saving, time-saving, truck-saving, storage-saving* and *cost-saving* for defense when you place "Steelcrete" in your next construction specifications.

"IT'S WHEELING STEEL"



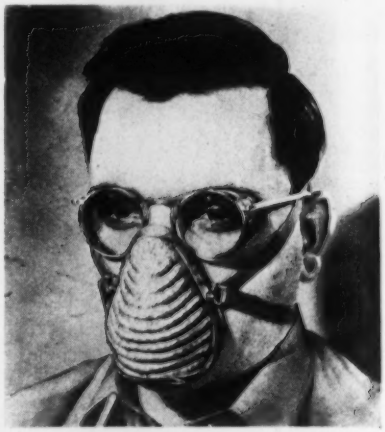
Defense needs the extra services of Steelcrete Reinforcing Mesh

16 STYLES

OTHER STEELCRETE PRODUCTS TO ACCELERATE VICTORY
EXPANDED METAL GUARDS for Men and Machines
EXPANDED METAL GUARDS for Windows and Doors
EXPANDED METAL MESH for Partitions and Enclosures
EXPANDED METAL WALKWAY MESH for Catwalks, etc.
LITERATURE ON REQUEST

THE CONSOLIDATED EXPANDED METAL COMPANIES
WHEELING, WEST VIRGINIA
Quick Shipments from 14 Warehouses

for rubber, copper, tin, aluminum, monel metal, stainless steel and other materials. Production is already under way in various forms such as threads, tubes, rods and sheets and extrusions from flexible to rigid grades.—*Colonial Alloys Co., Chemicals Division, Philadelphia, Pa.*



Respirator

The American Optical Co. has announced a new respirator for protection against toxic dusts. Representing an entirely new design, this new American R9100-T respiratory protector is light in weight and gives full vision, while the entire face piece is itself a filter and compresses maximum protection area into minimum space. The closely felted, laboratory-tested filter has been approved by the U. S. Bureau of Mines for protection against the inhalation of toxic or poisonous dusts (dispersoids or particulate matter formed by the disintegration of solid materials) as lead, cadmium, arsenic, chromium, manganese, and other products.—*The American Optical Co., Southbridge, Mass.*

Blackout Relays

A non-explosive blackout relay for electrical service systems has been developed by Durakool, Inc. The relay is said to be free from all outside influences, is all metal, permanently sealed under hydrogen at high pressure, quenched arcing, has non-oxidizing contacts, higher speeds and can stand rougher use and abuse.—*Durakool, Inc., North Main St., Elkhart, Ind.*

Glass Fiber

A new blast-cushioning, incombustible glass fiber material for blacking out war production plants has been announced by the Owens-Corning Fiberglas Corp. The material is designed to reduce damage from concussion and to provide protection against the spread of fire caused by incendiary bombs or explosives. In

MAKE AMERICA STRONG...IN THE AIR...AND IN THE GROUND!

Build the sturdiest pressure lines possible with Lock Joint Reinforced Concrete Pipe. Walled by dense concrete, reinforced with tough steel, Lock Joint pipes are a bulwark of defense against the forces of concussion. The unusual elasticity and flexibility of the expansion joints safeguard each length of pipe under the stress of sudden and unequal earth movement. Nor can those enemy agents of time, corrosion and tuberculation, successfully attack or sabotage the steady-smooth flow of these pipes. They will maintain their original high-carrying capacity for generations... In keeping with these strenuous times Lock Joint pipes lines are "tailor-made" to your particular requirements, thereby using less of those essential materials so necessary to our war effort. Whether your project is large or small, your 'phone call, telegram, cable or letter to any of our offices will bring a prompt reply.

LOCK JOINT PIPE COMPANY

Established 1905

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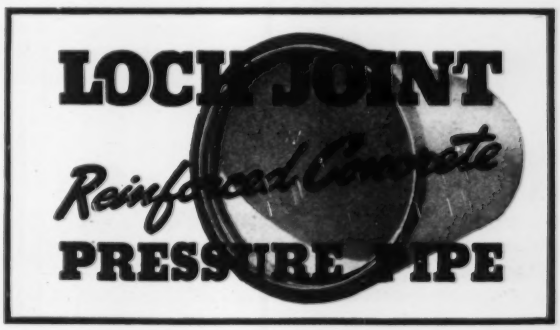
Denver, Colo. · Chicago, Ill. · Kenilworth, N. J. · Kansas City, Mo. · Rock Island, Ill.
White Plains, N.Y. · Valley Park, Mo. · Cleveland, Ohio · Hartford, Conn. · Navarre, Ohio

SCOPE OF SERVICES *Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply Mains as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous lines.*



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MORE PROFITS!

On a wide range of applications, Murphy Diesels have conclusively demonstrated their superior performance — economy and dependability. Rugged . . . compact . . . dependable . . . full rated horsepower. Available in sizes from 85 to 200 HP.; generator sets 55KW to 115KW, A.C. or D.C.

Write for complete information.

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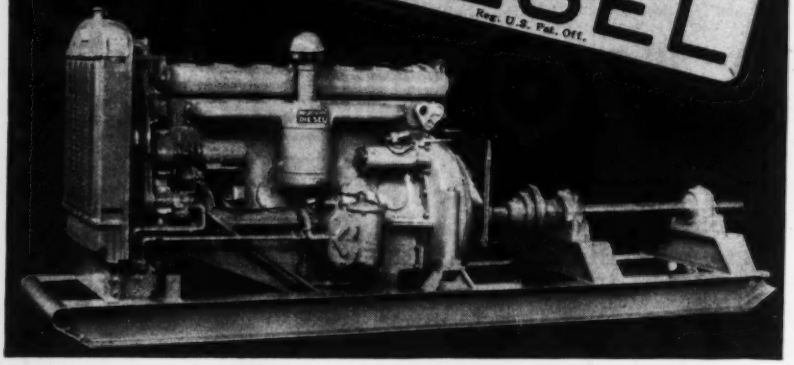

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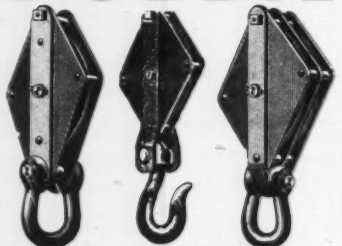
OPEN STEEL FLOORING

Pressure Formed
90% Open Area
Easy to Install

Hendrick Manufacturing Company
45 Dundaff Street, Carbondale, Pa.

DOBBIE

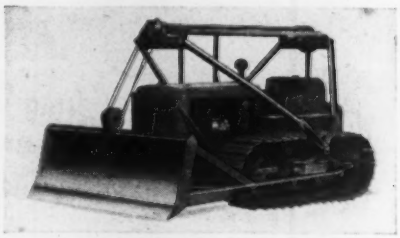


Dobbie Foundry & Machine Co.
Niagara Falls, N. Y.
DERRICKS • WINCHES • SHEAVES

addition to their fire resistance and sound absorbing properties, all the glass fiber products designed to contribute to the air raid protection of industrial plants provide a high degree of heat loss reduction and sound absorption. Both of these latter properties are important to the war economy. Where large window areas are to be covered for the duration of the war, use of the glass fiber blackout materials can save 60 to 90 percent of the heat ordinarily lost through the glass.—*Owens Corning Fiberglas Corp., Toledo, Ohio.*

Glass Coating

"Skyco No Glare", developed by the Skybryte Co., has been recommended for use in camouflaging factory buildings. The product, easily applied to glass, admits 94 percent of daylight, reduces heat by 15 percent and shuts out the glare. It is furnished in sky blue and light green, both lending themselves perfectly to any scheme of camouflage.—*The Skybryte Co., 3125 Perkins Ave., Cleveland, Ohio.*



Bulldozer

The J. D. Adams Co. has announced the addition of a bulldozer to its line of roadbuilding and earth moving equipment. The new machine, known as the No. 181, has been specifically designed for use on TD-18 wide tread TracTracTors, is a single-cable controlled machine and is engineered to provide the even weight distribution necessary for good balance and maneuverability.—*J. D. Adams Co., Indianapolis, Ind.*

Cement Gun

A new type of cement gun, called the "BONDact" gun, has been developed by the Hiram Elliott Construction Co. Its general appearance is much the same as an ordinary cement gun and operation is almost exactly the same. The gun applies a mixture of sharp sand, cement and water a very high velocity. In action, a considerable portion of the sand rebounds upon the first application and a cement coating is deposited at first, after which less sand rebounds and there is built up a coating of mortar of any desired thickness. Very little water is required, only about three gallons of water to a sack of cement. This process

Let's make it *ALL OUT* for Victory - not *TIME-OUT* for repairs!

To avoid costly mechanical delays, have a Cities Service lubrication engineer study your problems and recommend a sound lubrication plan to suit your particular needs.

War production, with heavy equipment, means plenty of headaches—sure! But you'll worry less about costly breakdowns if you have a system of lubrication that is designed especially to do your job.

A Cities Service lubrication engineer will be glad to help you with this plan. He understands your business. He knows all the ways there are to keep your Diesels going at top speed . . . and how to keep time lost for repairs at an absolute minimum.

There is no charge for this friendly consultation. Why not fill in the coupon below and mail it today?

In addition, we'd like to show you what Cities Service's famous *Sealed* Lubrication can do for you —tough Trojan Lubricants in the toughest grease gun ever built! Sealed Lubrication is a natural for the tough jobs facing us today. Check the coupon below—now!

OIL IS AMMUNITION—USE IT WISELY!

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ONCE-ALWAYS

Write to —
CITIES SERVICE OIL COMPANY
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Please send me information concerning your Engineers' Lubrication Service. ☐

Please show me what Sealed Lubrication can do for me. ☐ E.N.R.

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A LUBRICANT FOR EVERY INDUSTRIAL NEED

For ALL double-hung window construction... Specify Pullman Balances

"Double-hung wood windows" is the 1942 specification. For this construction, Pullman Balances offer *quickest, lowest cost* assembly. Complete range of sizes, in top and side models, accommodate windows 1⅜", 1¾", 2¼", or any other thickness, in weights up to 210 pounds. Pullman Balances, made since 1886, are the up-to-the-minute choice for all construction—industrial, residential or military.

WRITE for descriptive literature, specifications, and window detail drawings. Pullman Manufacturing Corp., Dept. C-5, 1170 University Ave., Rochester, N.Y.

Specify PULLMAN Sash Balances

Building Hot Weather Service into ... WISCONSIN AIR-COOLED ENGINES

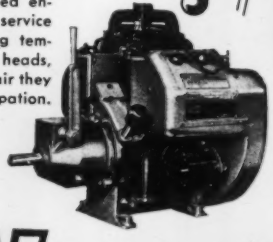
● By moving a constant flow of 500 cubic feet of air per minute, at a velocity of 1000 ft. per min., at a normal engine speed of 1800 rpm. . . .

And by *proportioning* this large volume flow of air to suit the cooling requirements of the various parts of the engine . . . directing the air currents where needed by means of baffle plates and airstream channels . . .

Wisconsin heavy-duty air-cooled engines give efficient, reliable service at extremely high operating temperatures. Cylinders, cylinder heads, valves and pistons get all the air they need for adequate heat dissipation.

Combination fan-flywheel provides ample cooling blast.

Balanced air-blast distribution reaches all parts that need cooling.



Illustrated is the Model VE-4 V type 4 cyl. engine. Other types and sizes, 1 and 4 cyl., 1 to 35 hp.

MOST POWER Per POUND

WISCONSIN MOTOR Corporation

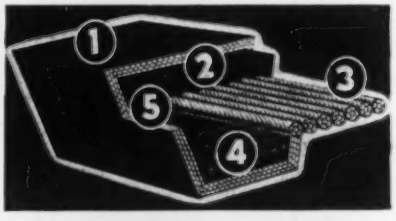
MILWAUKEE, WISCONSIN, U. S. A.

World's Largest Builders of Heavy-Duty, Air-Cooled Engines

is said to result in a mortar coating which has very high bonding qualities. —*The Hiram Elliott Construction Co., 1016 Baltimore Ave., Kansas City, Mo.*

Magneto Tester

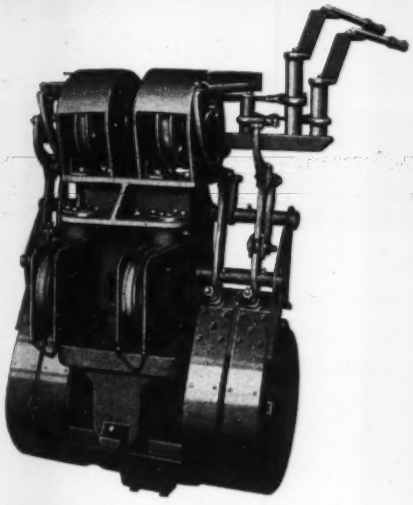
A tester for magneto windings which eliminates all uncertainty as to whether or not a given winding meets specifications in every respect, or is imperfect and should be replaced, has been developed. The tester meets growing necessity of maintaining present magneto ignitions on construction and other heavy equipment at peak operating efficiency. —*Eisemann Magneto Corp., 60 East 42nd St., New York, N. Y.*



Multiple V-belt

The Goodyear Rubber Co. has recently changed its multiple V-belt line to take advantage of the wide scope of research work and available data from the compounding department of the company's tire division. Sheathed with a new, tougher, black cover that insures longer wear, more uniform pull and higher resistance to heat, oil and other factors, the new product takes advantage of the fact that the toughest, longest-wearing compounds have always been black in color because of the use of black carbon stocks, whose inherent qualities have made them most desirable to the compounders. This new, black E-C cord multi-V belt is made in all standard cross sections and lengths and is sold in sets,

DON'T *Penalize*



Model HD (Heavy Duty) Power Control Units —Single or double drum—for all larger model tractors.

•

Model MD (Medium Duty) Power Control Units—Single or double drum, recommended for all medium and small size tractors.

BUCKEYE TRACTION DITCHER COMPANY

Findlay, Ohio

your Tractors..

YOUR tractors are only as fast as the dozers you put on them. Sluggish dozer action puts a heavy penalty on your machines, robs you of the output they're built to deliver.

That's why so many contractors are turning to Buckeye cable control. Buckeye Power Control Units are lightning-fast—they'll keep pace with your tractors. Fingertip control gives instantaneous blade action with all the power you can use for lifting and crowding. All functions of dozer operation are coordinated smoothly and rapidly, whether on grading, backfilling, excavating or bulldozing.

It will pay you well to investigate the advantages of Buckeye Cable Control for operating Bulldozers, Trailbuilders, Scrapers, Rippers, and for a dozen and one other jobs.

Write to Buckeye today.

Built by Buckeye

Convertible Shovels

Trenchers

Tractor Equipment

R-B Finegraders

Road Wideners

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DOLLAR FOR DOLLAR... WEIGHT FOR WEIGHT...

● One of two new 25-ton Plymouth Locomotives (175 h.p. Caterpillar Diesel engine drive) used by B. V. Hedrick Gravel and Sand Co. to haul pit run sand and gravel to washing plant.

IT'S *Plymouth* FOR HAULING PERFORMANCE

... That's why you'll find so many Plymouth Locomotives carrying the load from excavation to processing. Plymouth gives you SPEED to keep schedules—POWER to haul more tons per load—and RUGGED CONSTRUCTION that stands up under constant operation.

Let us show you how to reduce haul-time in your operations. Ask us for *free* analysis of your haulage problems. Write today!

Plymouth Diesel • Gasoline • Gas-Electric • Diesel Electric Industrial Locomotives

PLYMOUTH LOCOMOTIVE WORKS

Division of The Fate-Root-Heath Co., Plymouth, Ohio

DE LAVAL STEAM TURBINE CO. TRENTON, N.J.

Manufacturers of

STEAM TURBINES . . . HELICAL and WORM GEARS . . . PUMPS: Centrifugal, Propeller, Clogless, Mixed Flow, Rotary Oil . . . Pump Priming Systems . . . CENTRIFUGAL BLOWERS and COMPRESSORS.

Hayward Buckets

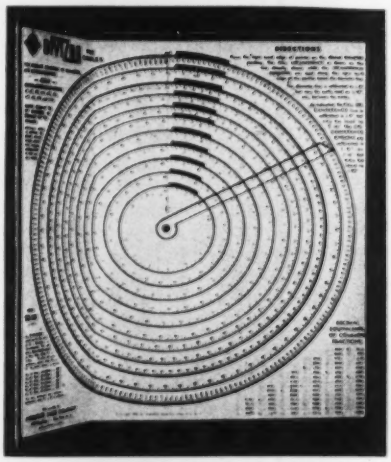
Use this Class "E" Clam Shell Bucket for handling crushed stone, gravel, sand and other bulk materials.

THE HAYWARD CO., 48-50 Church St., N. Y.

precision matched under operating tensions.—*The Goodyear Rubber Co., Akron, Ohio.*

Concrete Curing

A method of concrete curing, called the "Aquastatic" clear membranous method has been developed by the Solvents & Plastics Co. Recommended as a practical, positive and economical method of insuring complete hydration, maximum strength, durability and surface density, a single coat of the compound is said to dry to touch within 15 minutes to form an integrally adherent continuous membrane that is positive and constant in effect and thoroughly seals the surface, completing the curing operation. The compound also is said to insure improved qualities of surface density, strength and durability by retaining the original mixing water and preventing the rapid loss moisture and dilution.—*Solvents & Plastics Co., Laclede House, St. Louis, Mo.*



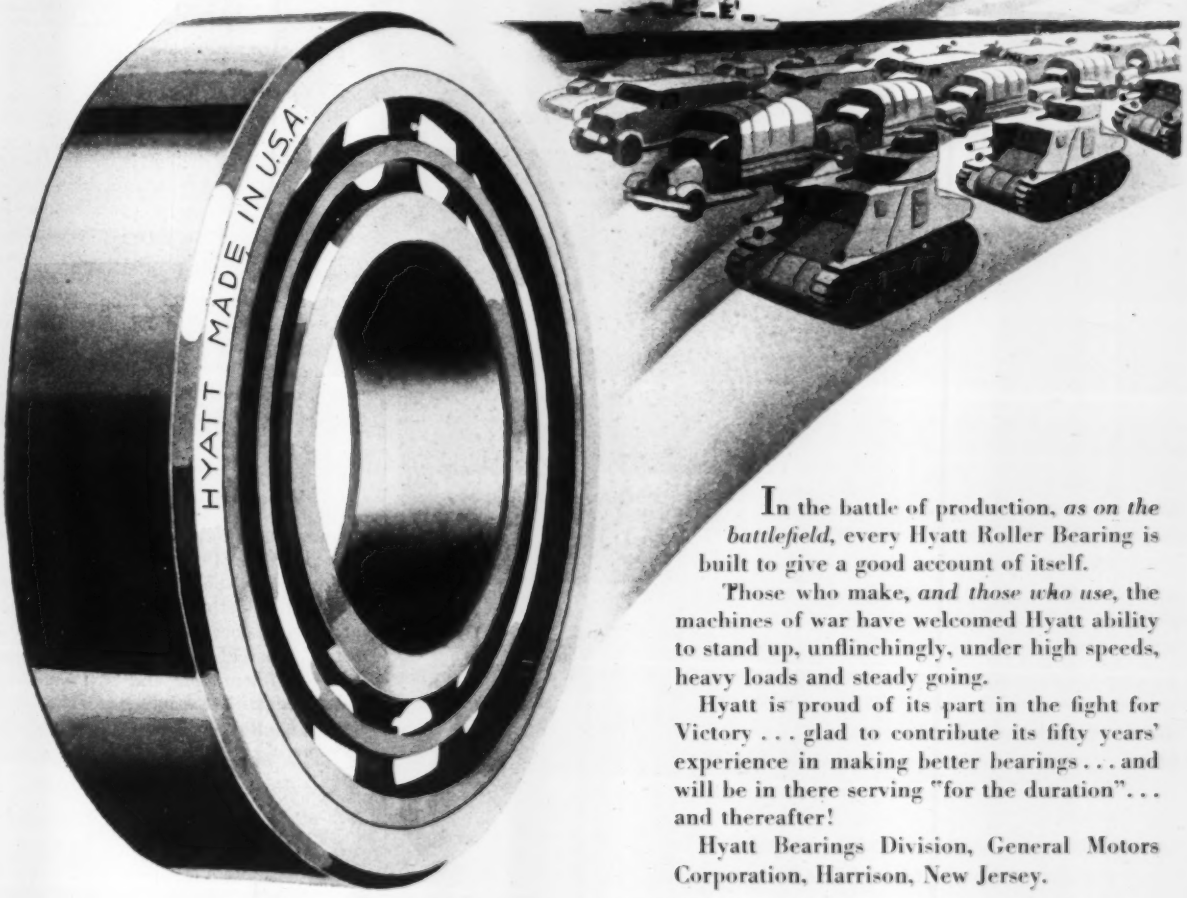
Calculator

A new calculator to give instant reading of diameters and circumferences of any circle up to 72 in. in diameter, in steps of 1/8 in. or less, has been developed. Called the "Divizor," the instrument makes it possible to obtain a reading simply by moving a pointer to the desired diameter. The smallest unit of calibration of the divizor is 1/16 inch. Readings can be taken to 1-32 inch in most cases, and 1/64 in some cases.—*Distributed by Interstate Sales Co., 1123 Broadway, New York, N. Y.*

Hard Rubber

Development by its research laboratories of a superior type of hard rubber made from Ameripol has been announced by the B. F. Goodrich Co. According to a report the new synthetic hard rubber will stand temperatures 100 deg. F. higher before softening than the

FIT... for the job ahead



In the battle of production, *as on the battlefield*, every Hyatt Roller Bearing is built to give a good account of itself.

Those who make, *and those who use*, the machines of war have welcomed Hyatt ability to stand up, unflinchingly, under high speeds, heavy loads and steady going.

Hyatt is proud of its part in the fight for Victory . . . glad to contribute its fifty years' experience in making better bearings . . . and will be in there serving "for the duration"... and thereafter!

Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

THIS IS THE 50TH YEAR OF HYATT ROLLER BEARINGS

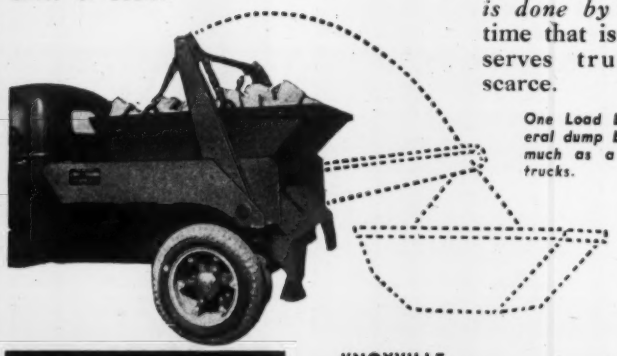
How to handle More per Truck

THE ANSWER is to equip your truck with the

Brooks LOAD LUGGER

and use it with 5 to 10 detachable buckets for *continuous* hauling and dumping . . . while the empties are being filled at convenient loading points on the job. Brooks System is the safest, simplest, fastest method of moving materials *wherever loading is done by hand.* It saves time that is vital, and conserves trucks that are scarce.

"One truck with a Litter of Bodies"



One Load Lugger with several dump bodies will do as much as a whole fleet of trucks.

Write for Catalog 44

KNOXVILLE TENNESSEE
2205 Davenport Road
Distributors in all Principal Cities

Brooks EQUIPMENT AND MFG. CO.

. . . If you want to make speed profitably . . . GET DEPENDABLE EQUIPMENT *. . Buy the Fast . . .*

JACKSON Hydraulic Concrete Vibrator

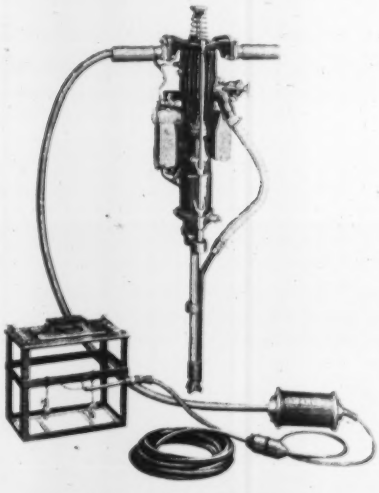
DESIGNED TO "TAKE IT" 3 SHIFTS A DAY—EVERY DAY

- Automatic pressure lubrication—requires no attention.
- 34-ft. hose—2¾" vibrator head.
- Adjustable frequency to 6800 R.P.M.—submerged in concrete.
- Powerful gas engine—4.7 H.P.
- Long-lived, ball-bearing, rotary, hydraulic pump.

USED EXCLUSIVELY BY MANY LARGE DEFENSE CONTRACTORS

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON, MICHIGAN

best hard rubber made from natural crude. Engineers point out that the new development will extend the field of hard rubber, since it overcomes many of the limitations which restricted the service of this type of rubber under extremely severe conditions.—*The B. F. Goodrich Co., Akron, Ohio.*



Gasoline Driller

The model J-2A driller is the latest addition to the line of Barco portable gasoline hammers. According to the manufacturers, this driller is recommended for rock drilling from the surface to a depth of 3 ft. and is particularly adapted to work where cost of operation and cost or difficulty of moving equipment are determining factors. The driller is rotated by hand, but a built-in ratchet makes possible one-man operation and permits the use of standard drill rods and detachable bits. The exhaust is utilized to clean cuttings from the drill holes.—*Barco Mfg. Co., 1814 Winnemac Ave., Chicago, Ill.*

Weather Stripping Sill

Known as Tenite-Two, a cellulose acetate product of Tennessee-Eastman, a new extruded, plastic threshold is being offered as a better weather-stripping sill for outside doors at the same price as metal thresholds. The material is practically indestructible and screw and interlocking hook are included. The sill is sold in lengths for standard door widths.—*Allmetal Weatherstrip Co., Chicago, Ill.*

Soldering Paste

A new bulletin which lists the various sizes of containers and the action of its many products has been issued by the M. W. Dunton Co., manufacturers of Nokorode soldering paste, fluid and salts. The bulletin contains a complete price list.—*The M. W. Dunton Co., 670 Eddy St., Providence, R. I.*

"Gulf Lubricants and Fuels make a big difference on a tough job"

*Says highway contractor**

* Fred Berlanti and Son, Inc., Harrison, New York, have a 6½-mile road construction job in Lebanon and Berks Counties, Pennsylvania. Gulf quality lubricants and fuels are helping this contractor secure efficient, trouble-free performance. The modern equipment employed includes compressors, drills, scrapers, shovels, ditchers, bulldozers, and trucks.

"Mud or dust, hot or cold, we get top-notch performance from our equipment and extra hours of trouble-free operation with Gulf products."

"ALL-WEATHER protection with Gulf lubricants and the uniform high quality of Gulf fuels are playing a big part in our rapid progress on this job," says Louis Berlanti, President. "In spite of day-to-day changes in operating conditions, our equipment is performing at top-notch efficiency, and we have avoided delays caused by mechanical troubles."

You get these three advantages when you use Gulf products: First, an experienced Gulf engineer recommends—on the job—the proper types and grades for each requirement. Second, you're *sure* of getting lubricants exactly suited to your equipment and to your operating conditions—for the Gulf line includes over 400 quality oils and greases. Third, Gulf's wide distribution through more than 1200 warehouses, located throughout 30 states from Maine to New Mexico, insures prompt delivery, no matter how remote the job.

Write or 'phone Gulf now and arrange to use Gulf higher quality lubricants and fuels on your next job. They will help you complete it more quickly and at a bigger profit.

GULF OIL CORPORATION · GULF REFINING COMPANY · PITTSBURGH, PA.

To prevent scouring and undermining ARMCO sheeting was driven into the streambed 30 inches from the abutment face. J-bolts anchored the sheeting and a firm footing was provided by cleaning and filling the open space with concrete.

A Saving Hint ON BRIDGE MAINTENANCE

• When scouring or undermining weakens bridge abutments here is a helpful hint: Use ARMCO Sheeting to assure a firm footing, reduce maintenance and protect the bridge structure.

Then you will have the same advantages that make ARMCO Sheeting ideal for trench work, cofferdams, cut-off walls and bulkheads. The corrugated metal design provides ample strength without excessive weight, which means quick, easy handling. It drives fast because of the small displacement area and smooth surfaces. On temporary jobs you can pull ARMCO Sheeting again and again for re-use. Individual units nest snugly together for space-saving in storage or transit.

An ARMCO Sheeting is supplied for every purpose—Flange Type, Clip-Type and Interlocking. Write for data. Armco Drainage Products Assn., 125 Curtis Street, Middletown, Ohio.

ARMCO SHEETING

Manufacturers' Activities

Eight employees of the WESTINGHOUSE ELECTRIC & MFG. CO.'s East Pittsburgh works recently were awarded the Westinghouse Order of Merit for distinguished service. Recipients of the award, a medal, were: A. S. WENTWORTH, R. E. MARBURY, A. H. BAKKEN, H. N. BLACKMON, L. E. SCHUMACHER, J. B. GEORGE, T. J. SCHRIMSER and EDWARD GRIFFITHS.

PAUL WASSMANSDORF has been appointed advertising manager of the GENERAL ELECTRIC CO.'s appliance and merchandise department's plastics division at Pittsfield, Mass. Mr. Wassmansdorf succeeds W. D. HAYLON, who is now with the U. S. armed forces.

The SERVICE SUPPLY & EQUIPMENT CO., of Philadelphia, Pa., has been appointed a distributor for the LEROI CO., of Milwaukee, Wis.

J. THOMAS HAY, 59, metallurgist who was instrumental in the development of Toncan copper molybdenum iron and was long a worker for the REPUBLIC STEEL CORP., died recently at Canton, Ohio.

The RUSTA RESTOR CORP., of Fremont, Ohio, manufacturer of cathodic protection equipment for steelwater tanks, has transferred RALPH THOMSON, formerly New England representative to Los Angeles, Cal. THE GREGG CO. of Philadelphia, Pa., eastern sales representative for the corporation, is temporarily representing the Rusta Restor in New England through Gregg's main office in Philadelphia.

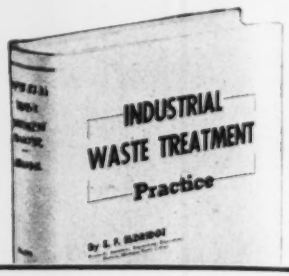
The plant formerly occupied at Ravenna, Ohio, by the BROWNING FOUNDRY CO. of Cleveland, has been purchased by J. J. CHAMBERLAIN, president of the RAVENNA CERAMICS CORP., and will be used to manufacture tygol, a new material used in fabricating processing equipment for refineries and chemical and metallurgical plants.

WILLIAM D. REED, formerly of the REPUBLIC STEEL CORP., has been appointed general manager of sales for the SAWHILL MFG. CO., of Wheatland, Pa., to supervise sales of tubular products including fabricated pipe, pipe nipples, scaffolding and other items.

DEAN E. MCCRORY, attached to the Pittsburgh office of the heavy chemical sales division of the PENNSYLVANIA SALT MFG. CO. since 1936, has been transferred to the company's executive offices in Philadelphia. He will be concerned with the

INDUSTRIAL WASTE

—how to analyze it
—how to utilize it
—how to treat it
—how to dispose of it



These are the topics carefully and thoroughly discussed in this *first comprehensive guide to the whole problem of industrial wastes.* The information the book presents is the kind the engineer needs in his analysis and treatment of a specific industrial waste problem.

Just Out!

INDUSTRIAL WASTE TREATMENT PRACTICE

By E. F. ELDRIDGE
Research Associate, Michigan State College

401 pages, 6 x 9, 79 illustrations . . . $5.00

The data included in this book are the latest and most accepted results of wide and authoritative industrial waste research surveys. The book covers not only analysis of the problem but also the treatment methods, the structures and the equipment required to secure desired results. Here is a how-to-do-it book that every sanitary engineer and industrial executive, faced with waste disposal problems, will want to know and refer to.

You will want to look up:—

—measurement of stream flow;
—testing wastes for composition;
—treatment of wastes from the beet-sugar industry;
—treatment processes of milk products wastes;
—fat recovery from sheepskin-tannery wastes;
—recovery and utilization of wastes from pulp and paper mills;
—preparing textile wastes for treatment;
—segregation and recovery of meat-packing and slaughter-house wastes;
—biological filtration of laundry wastes;
—methods of disposal of wastes from the metal industries;
—treatment methods of gas and coke-plant wastes;
—etc., etc.

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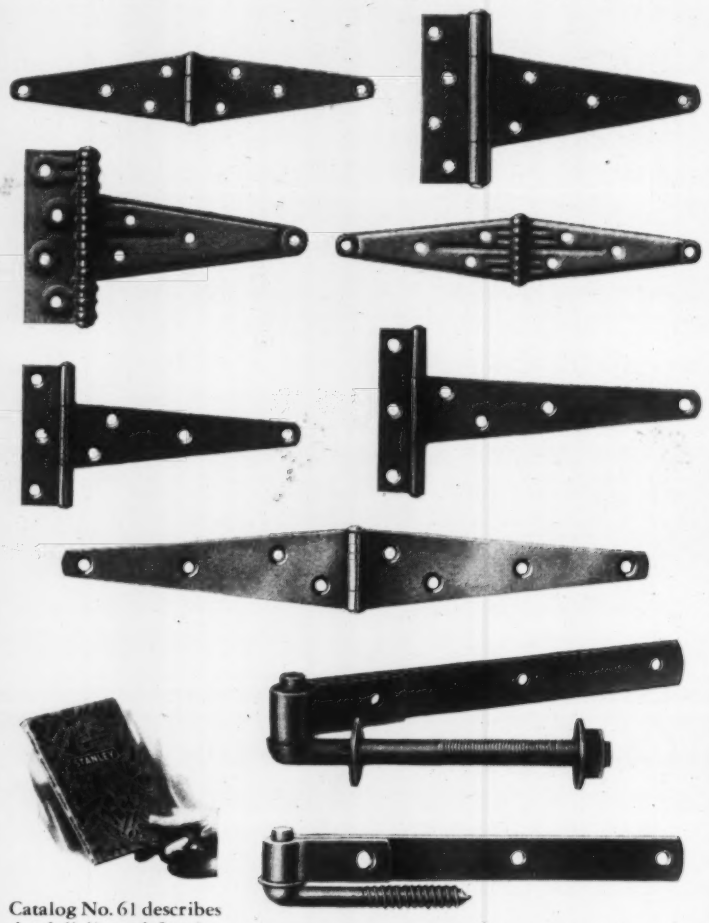

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sale of a number of important products of the company.

The AMERICAN BRIDGE CO. has announced the removal of its St. Louis district office from 506 Olive St. to the Shell Building, 1221 Locust St., St. Louis, Mo.

H. B. HIGGINS, director and vice president of the PITTSBURGH PLATE GLASS Co., has been elected to the office of executive vice president.

The HERD EQUIPMENT CO., INC., of Oklahoma City, Okla., has been appointed distributor for products of the DIAMOND IRON WORKS, INC., of Minneapolis.

The CITY MACHINE WORKS, INC., of Columbus, Ohio, has taken over the long unused plant and machinery of the late John Young, at Chillicothe, Ohio.

HENRY A. ROEMER of Pittsburgh has been reelected chairman of the board and president of the SHARON STEEL CORP., of Sharon, Pa.

The FARUB FOUNDATION CORP. has announced the removal of its New York offices to 331 Madison Ave., New York.

WALTER S. PERRINE, president of the CHICAGO TILE CONTRACTORS ASSOCIATION and secretary-treasurer of the RAVENSWOOD TILE CO., died in Chicago recently. He was 56.

The MARION STEAM SHOVEL CO., of Marion, Ohio, has announced the appointment of J. A. RILEY, district manager of its New York office, as export manager.

ANDREW L. MONROE, director of the agricultural and development department of CAROLINA POWER & LIGHT CO., Raleigh, N. C., has resigned to go on active duty as a major in the Army Air Corps.

The FURR-COATES CO., of Concord, N. C., was dissolved April 10 and a new company to be known as Coates Construction Co. was formed.

S. J. HORRELL, formerly of the BLAW-KNOX CO., Pittsburgh, Pa., has been appointed vice president of the ASSOCIATED PIPING & ENGINEERING CO., LTD., of Los Angeles, Cal.

P. Y. DANLEY, head of war products of the merchandising division for WESTINGHOUSE ELECTRIC & MFG. CO., has been appointed assistant sales manager of the merchandising division.

ERSKINE RAMSEY, Birmingham mining engineer, has been reelected chairman of the board and general consulting engineer of the ALABAMA BY-PRODUCTS CORP. J. W. PORTER was reelected president; H. L. MORROW, vicepresident and treasurer; J. A. SHOOK, secretary; H. M.

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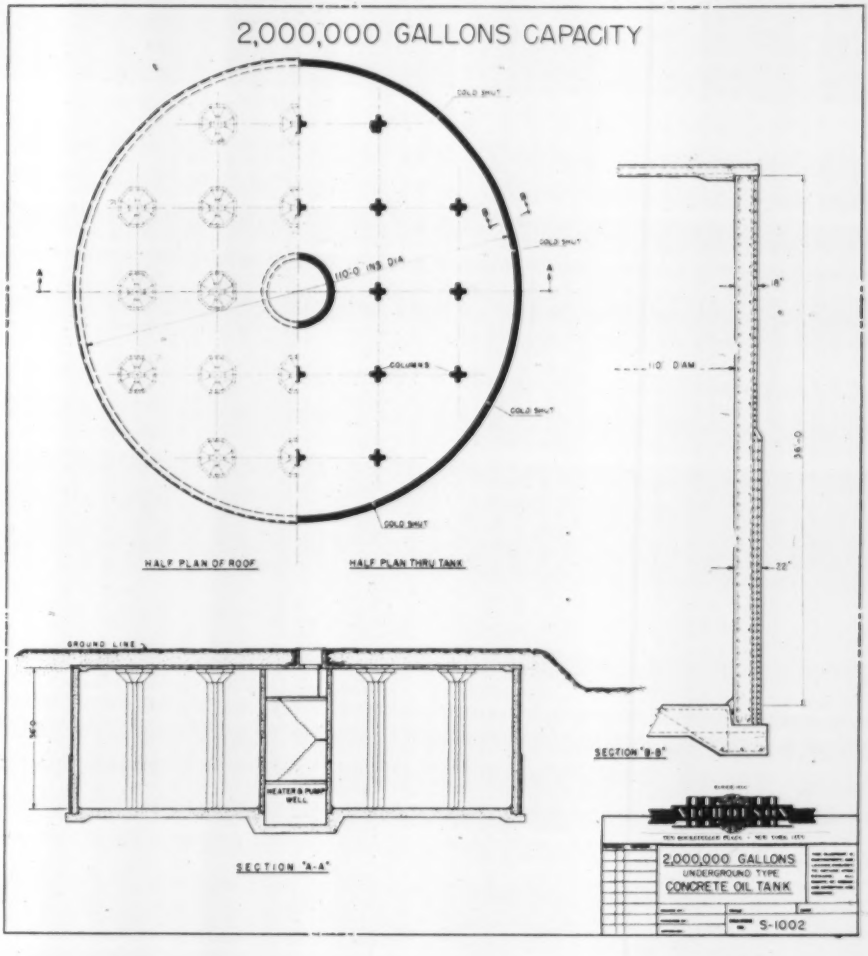
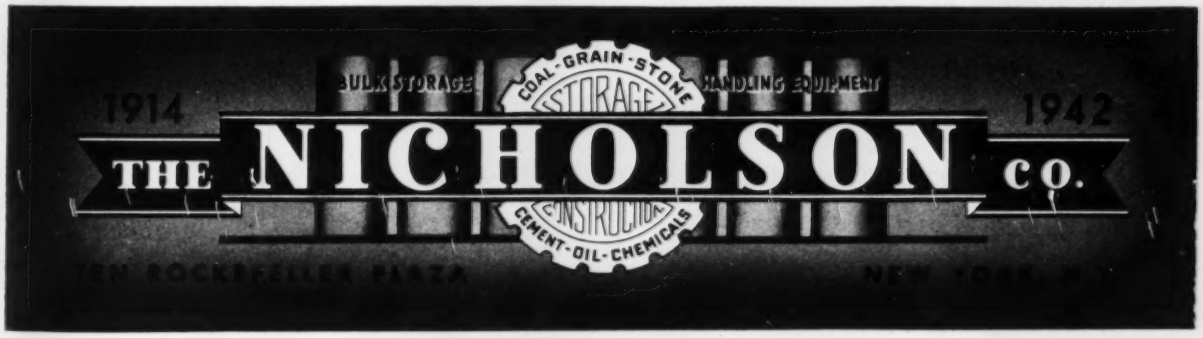
City of Kansas City, Kansas
City of Memphis, Tenn.
City of New York
Colgate Palmolive Peet
Consolidated Edison Company, N. Y. C.
D. L. & W. Coal Company, N. Y. C.
Dominion Glass Company, Toronto
Dominion Sheet Metal, Ltd.
DuPont Company, Wilmington
Erie Railroad Company
Freeport Sulphur Company
General Aniline Company
General Foods Corporation
Great Lakes Carbon Corporation
H. J. Heinz, Pittsburgh
Household Fuel Company, Hartford
International Harvester Co.
Jersey Central Power & Light Co.
Lancaster Cotton Co., S. C.
Leaside Munitions Company
Lehigh Portland Cement Co.
Lehigh Valley Railway
Libbey-Owens-Ford Glass Co.
Linde Air Products Company
Lone Star Cement Corporation
Montreal Cottons, Ltd.
National Gypsum Company
New York Central Railway, N. Y.
N. Y. & Queens Elec. Light & Power Co.
North American Cement Company
Pennsylvania Railway Company
Pittsburgh Corning Corporation
Pittsburgh Coke & Iron Company
Plibrico Company, Chicago
Reading Railway
Semet Solvay Company, Buffalo
Southern Railway, Atlanta
Stone & Webster Corporation
Tattersall Company, Trenton
United States Army
United States Navy
United States Dept. of the Interior
Universal Atlas Cement Company
Vermont Asbestos Corporation
Westinghouse Company, Pittsburgh



THE Nicholson Company, in full war production effort, are designing and building a great number of concrete tank installations for various war liquids and chemical materials, taking the place of unobtainable steel plate. Your emergency requirements, too, can be promptly designed and proposed, and actual construction of concrete tanks quickly completed.



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Built under extreme emergency and with amazing speed, thousands of Layne Wells and Pumps are providing billions of gallons of water for war needs—Army Camps, Flying Fields, Naval Stations, Ordnance Works, Chemical Plants, Munition Plants and numerous fortified outposts. Though built with utmost speed, those Layne Water Systems have the strength and ruggedness which will last for years and years.

Layne Well Water Systems, regardless of when, where or how speedily built, are the finest that can be constructed. They will faithfully fulfill their mission until victory comes, whether this year, next year or years from now.

Those men of the Army, Navy and Marine Corps who some day will return to civilian life may well remember that it was Layne who built the well water systems which helped to win the war.

In the meantime, essential civilian water supply service continues. The Layne organization is fulfilling its pledge of "Keep Them Flowing!"

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Layne-Atlantic Company	Norfolk, Va.
Layne-Central Co.	Memphis, Tenn.
Layne-Northern Company	Mishawaka, Ind.
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Layne-New York Co.	New York City.
Layne-Northwest Company	Milwaukee, Wis.
Layne-Ohio Company	Columbus, Ohio
Layne-Texas Company	Houston, Texas.
Layne-Western Company	Kansas City, Mo.
Layne-Western Co. of Minn.	Minneapolis, Minn.
Layne-Bowler New England Corp.	Boston, Mass.
International Water Supply, Ltd.	London, Ont.

WORLD'S LARGEST WATER DEVELOPERS

COWART, assistant secretary and assistant treasurer.

W. V. PETERS, formerly sales manager, has been made vice president and elected a director of the TRUSCON STEEL CO., of Youngstown, subsidiary of Republic Steel Corp.

W. C. BUCHANAN, president of the ALLIS-CHALMERS MFG. CO. since January 5, 1942, has resigned due to ill health. Mr. Buchanan, who is also president of the GLOBE STEEL TUBES CO., will remain as a member of the board of directors and the executive committee of the Allis-Chalmers organization.

MAJ. JOHN SLEZACK, of Sycamore, Ill., has been assigned new duties as chief of the tank combat vehicles division of the Chicago ordnance district, it has been announced. Maj. Slezak is on leave of absence from his post as president of the TURNER BRASS WORKS of Chicago.

The FIDELITY CONSTRUCTION COMPANY of Frankfort, Ky., organized for grading, excavating and for construction of buildings, railroads, etc., was granted a charter by the Kentucky secretary of state recently. Incorporators are FRED D. SCHLEIFER and FRANK J. STRAUB of Frankfort, and PHILIP BARNETT of Louisville.

CHARLES L. IRELAND, 80, chairman of the board and founder of the BIRMINGHAM SLAG COMPANY, died April 22.

E. I. EVANS, southern district manager of the REPUBLIC STEEL CORPORATION has been elected a vice president and member of the executive committee of the Associated Industries of Alabama.

WILLIAM W. FRENCH SR., president of the MOORE-HANDLEY HARDWARE COMPANY of Birmingham, Ala., recently was elected president of the Southern Hardware Jobbers Association.

To honor employees who have entered the service of the nation, an honor roll is posted in a novel manner on a victory "V" in the assembly room of the GARDEN-DENVER rock drill manufacturing plant in Denver, Colo. As additional employees enter the services, their names are entered on the "V".

GEORGE T. CHRISTOPHER, vice-president in charge of Packard manufacturing, was named president and general manager of the PACKARD MOTOR CAR COMPANY recently.

J. B. ENNIS, FRANK J. FOLEY, CHARLES G. HARDY and LEWIS L. CLARKE recently were reelected directors of the AMERICAN LOCOMOTIVE COMPANY.

Any WHEELBARROW WILL DO . . . WHAT'S THE DIFFERENCE?

STERLING engineers began (back in 1904) to answer "What's the difference in wheelbarrows" by offering "Easy Wheeling", perfect balance and other *engineered* advantages. For nearly 40 years, Sterling has stuck to producing *engineered* quality wheelbarrows, and buyers have stuck to Sterling!

STERLING WHEELBARROW CO., MILWAUKEE, WIS.

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ELECTROLINE-FIEGE Wire Rope Connectors hold with a "Bulldog Grip" because their special design gives them a tighter bite. They are easy to install, streamlined and prevent dangers from undamped vibrations which cause crystallization, frayed cables and failures. Full rated cable strength in every connection.

Prove to yourself that they are better and why many leading wire rope users have made them standard on jobs where performances must not fail. Write today for complete details and the booklet, "Positive Grip".

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NEW PUBLICATIONS

Steel Stamps—A new supplement to its general catalog, illustrating and describing steel stamps and various steel type holders for every stamping need has been issued by the Jas. H. Matthews & Co. The supplement gives sizes and prices for ordering and describes many of the uses to which the stamps may be put.—*James H. Matthews & Co., 3942 Fourth St., Pittsburgh, Pa.*

Wire Nuts—A bulletin showing the simple application of Ideal wire nuts, a method of remaking speedy wire joints has been issued. The catalog, which stresses that the applications advertised save many vital materials, gives detailed instructions for the use of the appliances and tells of their advantage over solder and tape connections.—*Ideal Commutator Dresser Co., 1279 Park Ave., Sycamore, Ill.*

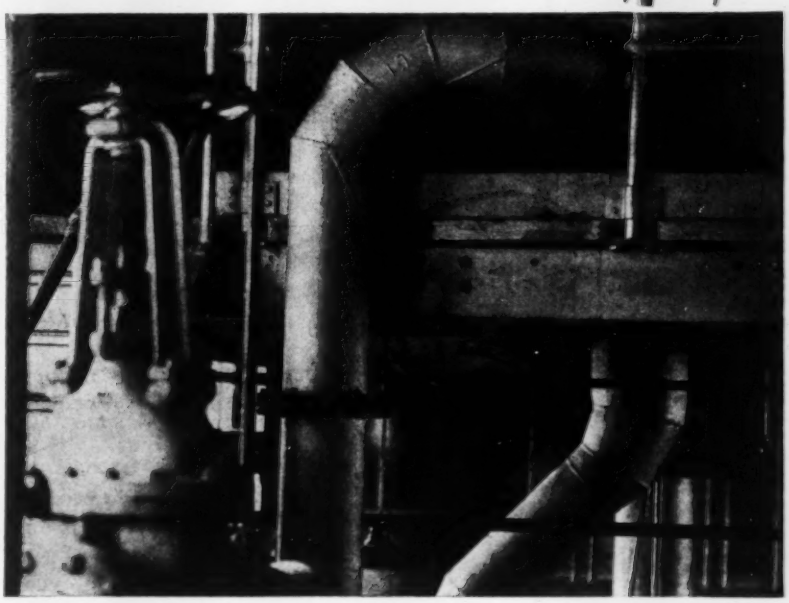
Rubber Sponge—A 4-page catalog section on its recently announced synthetic rubber sponge, made from its Ameripol synthetic rubber, has been published by the B. F. Goodrich Co. The catalog section points out that the new product has all the essential characteristics of natural sponge rubber and in many respects is far superior. Properties are described and dimensions given for stock sizes of available slabs, tubing, cord and molded shapes.—*B. F. Goodrich Co., Akron, Ohio.*

Weather Control—An 8-page bulletin showing industrial and other applications of Trane cooling systems is now available. The catalog describes uses of the equipment in such various places as shell loading plants, railroad trains and factories.—*The Trane Co., LaCrosse, Wis.*

Plywood Finish—An ideal finish for plywood is the title of a new folder just produced by the O'Brien Varnish Co. The folder describes the procedure and advantages of finishing plywood, particularly fir plywood, with O'Brien Penchrome "Blonde" wood finishes. It is claimed that users of fir plywood in dry wall construction will eliminate the need for expensive joint treatment through the use of this preparation.—*O'Brien Varnish Co., 101 N. Johnson St., South Bend, Ind.*

Air Conditioners—A new bulletin, G-2, has been issued by the Air and Refrigeration Corp., describing the capillary cell and its application in air conditioning equipment as a direct heat transfer surface between water and air. The book outlines the functions of the cells for cooling and dehumidifying, hu-

HOW TO SPEED UP WAR-INDUSTRY PIPING



Even the most intricate pipe assemblies go in fast and accurately when you use ARMCO Spiral Welded Pipe. This is especially important now when engineers are so hard pressed with vital war construction.

ARMCO's method of pre-fabricating pipe means that standard or special fittings are made-to-order and come welded to straight pipe runs. This eliminates a pair of flanges at every bend, reduces weight and saves hours of tedious assembly.

Efficient operation is also assured. ARMCO Pipe is smooth inside for high flow capacity and is easy to keep clean. The fewer flanges mean fewer joints and less chance for leaks. Maintenance is low.

Learn how ARMCO Spiral Welded Pipe can help speed your important war-time construction. Diameters range from 6 to 36 inches, wall thicknesses from 7/64 to 1/2-inch. Write us regarding your specific piping problems. The American Rolling Mill Company, Pipe Sales Division, 1551 Curtis Street, Middletown, Ohio.

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Water Supply Lines • Pipe Piles • Caissons • Line Pipe • Prefabricated Pipe • Dredge Pipe

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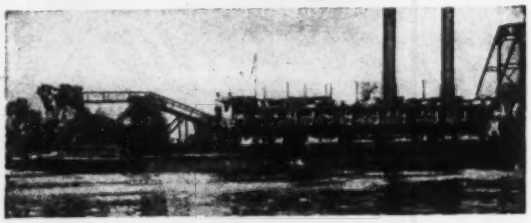

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midifying, air cleaning, evaporative cooling, condenser water cooling, fume absorption and other purposes. A section is devoted to standard central station units ranging in capacity from 1,100 to 132,000 cfm; as well as to self-contained units which include fans, heater, pump, etc., in an insulated casing ranging in capacity from 4,000 to 16,000 cmf.—*Air and Refrigeration Corp., 475 Fifth Ave., New York, N. Y.*

Paint—A new handy means of selecting the best paint without detailed technical study of properties of all finishes is provided in the Valdura Paint Selector, issued by American-Marietta Co. The selector makes conveniently available to the architects, contractors, purchasing officials, dealers and plant and building maintenance engineers all information on properties of 43 paint, enamel and varnish products. It folds to letterhead size, making it convenient to keep on a desk top for daily reference, or to file for future use.—*American-Marietta Co., 43 E. Ohio St., Chicago, Illinois.*

Use of Glass—A handsome brochure, prepared at the suggestion of the Division of Substitute Materials of the War Production Board as a means of aiding manufacturers to find substitutes for strategic materials no longer available has been issued by the Pittsburgh Plate Glass Co. Numerous products made from spun glass are enumerated and described, together with availability information and properties and a suggested list of uses.—*Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh, Pa.*

Tritometer—A pocket-size booklet, describing the operation of the Tritometer, a machine to ascertain, before pile driving is started, the carrying capacity of pilings. The booklet gives complete charts and data on performance of the instrument.—*Substrata Engineers, Inc., Washington, D. C.*

Tool Brazing—A bulletin on the subject of tool brazing and repair, showing how apparently impossible repairs have been made through the use of "Easy-Flow" has been issued by Handy & Harman.—*Handy & Harman, 82 Fulton St., New York, N. Y.*

Circuit Breaker—Small oil circuit breakers designed for use on alternating current circuits in industrial plants and power houses where interrupting capacities of 50,000 kva are required, are described and illustrated in a new 12-page catalog released by the Roller-Smith Co. These circuit breakers have continuous carrying capacities ranging from 600 to 3,000 amperes at voltages

up to 15,000 volts. They can be mounted on switchboards, pipe frames, self-supporting steel panels or on the wall. Manually and electrically operated designs are available.—*Roller-Smith Co., Bethlehem, Pa.*

The War Effort—"Armco Goes to War," a booklet issued by the American Rolling Mill Co. for its employees to inform them of the company's part in the nation's war effort is now available. Well illustrated, the booklet shows applications of many Armco products to all phases of America's armed forces.—*The American Rolling Mill Co., Middletown, Ohio.*

Glass—To provide manufacturers, industrial plants and stores with a list of what glass is available and what can be done with the material in lieu of other and more scarce materials has been issued by Libbey-Owens-Ford Glass Co. Handsomely illustrated, this 48-page booklet gives specifications for all types of glass listed.—*Libbey-Owens-Ford Glass Co., Toledo, Ohio.*

Arc Welding—An unusual booklet called "The Inside of Arc Welding" has been issued by the General Electric Co. Designed for use in welding schools and government agencies, the booklet describes a film made by the company for distribution to schools to aid students and teachers in appreciating the problem of welding.—*General Electric Co., Schenectady, N. Y.*

Pumps—Noting its war service to the nation, the Worthington Pump & Machinery Co. has issued a specially bound volume of photographs showing the various applications of its equipment. Accompanying the booklet is a new bulletin describing the company's new BBG gas engine for generator or equipment drive.—*The Worthington Pump & Machinery Corp., Harrison, N. J.*

Cast Iron Pipe—The quarterly issue of Cast Iron Pipe News, published by the Cast Iron Pipe Research Association is now available. Including unusually detailed drawings and photographs of the construction of the new Chicago subway, the bulletin shows many other applications of the pipe.—*The Cast Iron Pipe Research Association, Chicago, Ill.*

Crushers—Bulletins No. 1113 and 2105 have been issued by the Traylor Engineering & Manufacturing Co., to supersede previous issues describing the company's multi-stage fine reduction crusher and Type H Blake jaw crusher. Both bulletins, well illustrated, include detailed specifications of design and application of the products.—*Traylor Engineering & Manufacturing Co., Allentown, Pa.*

WEST DODD PROVIDES SIMPLE AND RELIABLE PROTECTION AGAINST LIGHTNING . . .

Lightning is a powerfully destructive force. And records of the National Board of Fire Underwriters' prove it ranks at the very top as a source of fire. But, if properly controlled, it can be tamed at reasonable cost before there is any chance of stalling men and machines engaged in vital war work.

PROTECTS ORDNANCE PLANTS

West Dodd lightning and static control equipment is being widely installed in Uncle Sam's ordnance plants for this reason. West Dodd is also protecting the power stacks and even factories of many important war industries.

Numerous West Dodd items have been especially designed and built to meet U. S. Government specifications. Approved by American Institute of Electrical Engineers, National Board of Fire Underwriters', and many other authorities. Equipment inspected and labeled at the factory by Underwriters' Laboratories, Inc. Backed by the oldest manufacturer in the field.

West Dodd Systems are IMMEDIATELY AVAILABLE for defense use. Write, wire, or telephone today for further information.

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LIGHTNING CONDUCTOR CORP.

A RELIABLE PROTECTION AGAINST A LEADING CAUSE OF FIRE
D/S
GOSHEN, INDIANA

FREE The West Dodd Engineering Dept. will be glad to assist in planning application, or estimating costs.

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Think how

THIS LIGHTWEIGHT PORTABLE COMPRESSOR WILL SPEED-UP YOUR WORK

A Smith Compressor will meet most of your demands for air-compressor operations!

And, of great importance, consider the savings you'll enjoy with their use! BIG SAVINGS in purchase cost over standard compressors of equal capacity — important savings on upkeep, too.

Smith Compressors are made with FORD MOTORS and STANDARD PARTS — that means dependability and economy. Repairs and parts are available at Ford garages everywhere. 60 cu. ft. size (illustrated) uses only one gallon of gasoline an hour! Easily portable — tow them from one job to another at permissible truck speeds. No couplings, belt, clutch or gears to wear and cause trouble. Head equipped with high speed compressor valves; automatic unloading and idling.

If large, cumbersome compressors produce a costly bottleneck for you, change to Smiths, NOW!

With a Ford Motor and shop facilities you can assemble your own Smith Compressor. We will furnish a Smith Compressor Head and Accessories with complete instructions for mounting.

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AIR COMPRESSORS

MEETINGS

AMERICAN SOCIETY OF PLANNING OFFICIALS, Indianapolis, Ind., May 24–28.

ASSOCIATED EQUIPMENT DISTRIBUTORS, 23rd semi-annual meeting, Edgewater Beach Hotel, Chicago, Ill., June 8–10.

AMERICAN WATER WORKS ASSOCIATION, Stevens Hotel, Chicago, June 21–25.

SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION, 50th annual meeting, Columbia University, New York City, June 29–July 2.

AMERICAN SOCIETY OF CIVIL ENGINEERS, annual convention, University of Minnesota, St. Paul, Minn., July 22–23.

REGIONAL AND LOCAL MEETINGS

NEW ENGLAND WATER WORKS ASSOCIATION, Manchester Country Club, Manchester, N. H., May, 1942 (Date to be announced).

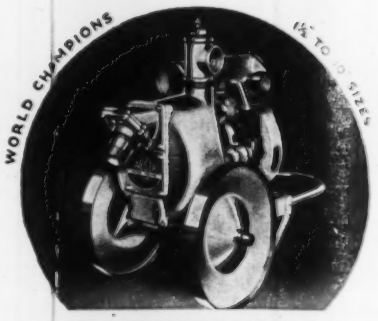
NEW YORK STATE SOCIETY OF PROFESSIONAL ENGINEERS, annual convention, Hotel New Yorker, New York, N. Y., May 14–16.

CENTRAL STATES SEWAGE WORKS ASSOCIATION, annual convention, Minneapolis, Minn., June 18–19.

Elections and Activities

MORE THAN 350 persons attended the 22nd annual meeting of the Canadian Section of the American Water Works Association, held in Niagara Falls, Ont., recently. O. H. Scott, manager of the Belleville Public Utilities Commission, was elected president, succeeding William Storrie, consulting engineer of Toronto. J. Clark Keith, manager of the Windsor Public Utilities Commission, was re-elected as representative on the governing body of the association, and Dr. A. E. Berry, director of the Sanitary Engineering Division of the Ontario Department of Health, was re-elected secretary-treasurer. The question of obtaining suitable priority for materials for waterworks maintenance and construction was a leading topic of discussion.

MEMBERS of the Northern Panhandle Chapter of the West Virginia Society of Professional Engineers gathered for a dinner meeting at Wheeling, W. Va., recently to hear Cyrus William Rice, president, Cyrus William Rice & Co., Inc., Pittsburgh, speak on "Feed Water Treatment Practices, Past and Present, and the



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- **PATENTED SELF-CLEANING SHELL.**
- **EVERY PUMP FACTORY TESTED** for high capacity and pressure.
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Control Side of Boiler Water Treatment."

CARLETON E. RICE, city engineer of Massillon, Ohio, was elected president of the Canton Regional Society of Professional Engineers and Surveyors at an annual meeting held at Canton recently. Other new officers include: William H. Gebhart, first vice president; Ralph Schory, second vice president; and Jess C. Sherrick, secretary-treasurer.

APPROXIMATELY 100 members of the Arkansas Society of Professional Engineers held an annual spring meeting at Little Rock recently and elected Joe E. Fry, Little Rock, as president. Other officers elected were: Frank Kirk, of Fort Smith, first vice president; Henry W. Schneider, of Little Rock, secretary-treasurer; W. G. Huxtable, of West Memphis, second vice president.

E. P. BERGHAMMER, of Gebhard-Berghammer, Inc., of Milwaukee, was re-elected president of the Milwaukee area General Contractors' Association at its annual meeting. Other officers chosen were: Walter T. Buchholz, of Walter T. Buchholz, Inc., vice president; T. L. Cottam, of Hunzinger Construction Co., secretary and treasurer; and H. F. Mielenz, of Kroening Engineering Corp., and Thomas H. Bentley, of Bentley Construction Co., directors. Stanley H. Eigel was retained as manager.

AL MAHAN, of Little Rock, Ark., was elected chairman of the twelfth annual Water and Sewer Conference held at the University of Arkansas this month. Other officers chosen are Ef F. Byerly, of West Helena, vice chairman; Harrison Hale, Fayetteville, secretary.

CLARENCE B. KEARFOTT, of Bristol, Va., was elected to succeed C. W. Huff, of Richmond, as president of the Virginia Society of Architects at an annual convention in Roanoke recently. Other officers include: Edward F. Sinnott, of Richmond, vice president, and Albert Haskins, of Newport News, treasurer.

MEN AND JOBS

S. C. Berry, city engineer at Lead, S. D., has joined the Corps of Engineers at Edgement, S. D., to aid in construction of an army plant there.

John F. Gallagher, assistant chief of the bureau of traffic engineering of Philadelphia, Pa., has been called to active duty as a lieutenant in the U. S. Navy.

T. A. Grissam has resigned as city engineer of Mount Pleasant, Tex., and has

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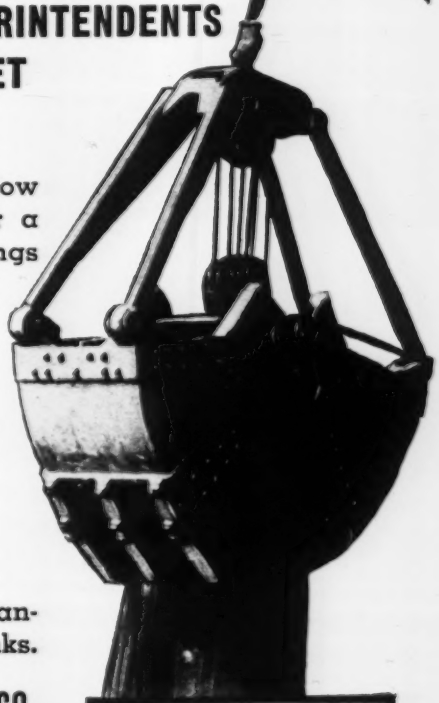

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become an associate engineer with the U. S. Army Engineers at Honolulu, T. H.

John Farquharson, draftsman for the New York state highway department, has been called to active service as a chief petty officer in the U. S. Navy engineering division.

Edwin F. Koester city traffic engineer of Wilmington, Del., has been appointed civilian defense coordinator for that city.

S. T. Usry, resident engineer with the North Carolina State Highway and Public Works Commission has entered active service with the U. S. Army.

W. H. Caffey has been named maintenance foreman of Greenville, Miss., charged with maintenance of streets.

Edward B. Evans, Jr., a civil engineer at Omaha, Nebr., has been named chief office engineer, in charge of construction of a new flying school at Hobbs, N. M.

William T. Bailey, formerly chemist at the Council Bluffs, Ia., water plant, has resigned to accept the position of chief engineer and superintendent of the water works at Kansas City, Mo.

T. C. Strunk has been named engineer in charge of the acquisition of needed land for the construction of an Army hospital near Asheville, N. C. **Capt. John H. Gavock,** area engineer, is in charge of construction, with a staff including **H. A. Churchill,** office assistant and **Allen S. Benjamin,** administrative assistant.

R. W. Angus, professor in the department of engineering of the University of Toronto has been awarded the George Warren Fuller award for distinguished service in the water supply field by the Canadian section of the American Waterworks Association.

G. F. Steele, assistant engineer of Atlanta, Ga., in charge of streets, has been granted a leave of absence to accept a commission as a captain in the Corps of Engineers. He has been a member of the city's construction department for 12 years.

H. T. Lofft, formerly an engineer assigned to the Fontana Dam project in North Carolina, has been appointed construction engineer for the South Holston and Watuga Dam projects of the Tennessee Valley Authority. He will make his headquarters at Bristol, Tenn.

Troy Godwin, assistant superintendent of the municipal water department at Dunn, N. C., has been appointed superintendent to succeed **David Clifford,** who

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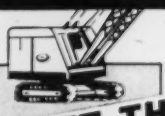

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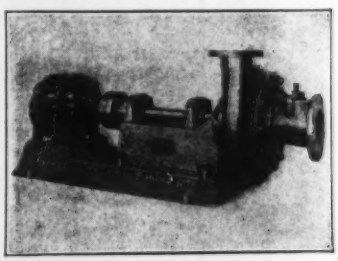

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Bulletin 206

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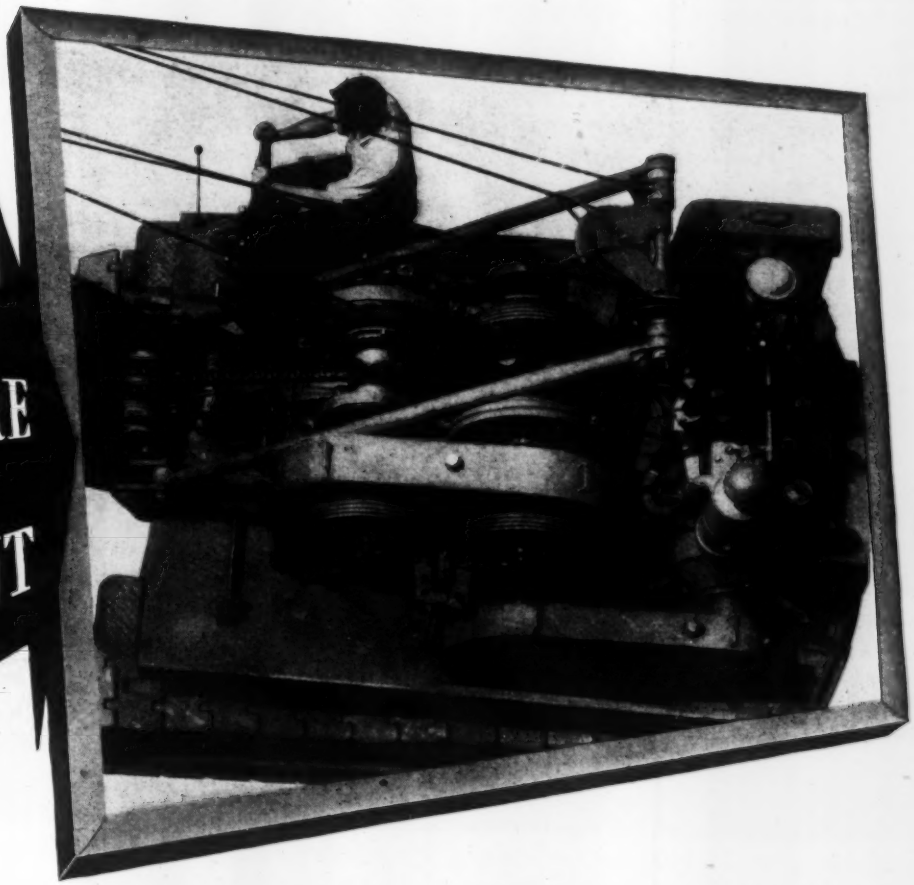
A PICTURE OF OUTPUT



STUDY this cab-less view of the 15-B shovel and you'll see many of the reasons it is giving owners a new idea of one-half yard output. The essential simplicity of design means smooth performance, ability to deliver big output on the 3-shift basis demanded by wartime conditions. Notice particularly:

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5. Independent, positive twin-rope crowd.
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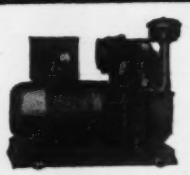

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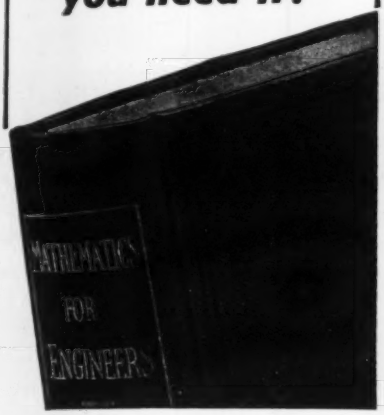

Experience showed Raymond W. Dull that for the practicing engineer a special kind of mathematics book was necessary. Convenience required that he have certain mathematical information available for quick reference. For this reason he prepared his own notes on mathematics in the course of his long engineering practice. At the suggestion of other engineers, Mr. Dull revised and extended his notes and the result of this was

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has been granted an indefinite leave of absence to join the armed forces.

E. W. Blom, assistant city manager of Ames, Ia., has reported for active duty as a major in the Corps of Engineers at Rock Island, Ill.

Robert F. Ruan, senior inspector of the Bonneville sub-station at Portland, Ore., has joined the Marine Corps as a first lieutenant.

Robert Vance, formerly an engineer for the Iowa State Highway Commission, has been appointed county engineer of Fremont County, with headquarters at Sidney.

Douglas Wright, former chief project engineer for PWA in Nebraska, has been sent to Vinita, Okla., as special assistant to the administrator of the Grand River project which the federal government is completing and operating.

H. F. Morrisey of St. John, N. B., district engineer for the Canadian department of transport, has been named a lieutenant-colonel of the Royal Canadian Artillery, reserve force.

Albert Becker of Columbia, Pa., a construction engineer for the Armstrong Linoleum company, has been called into service as a first lieutenant in the Corps of Engineers.

Maj. Oscar A. Piper has retired as principal assistant engineer for the city of Seattle, Wash., to accept a post with the Corps of Engineers.

J. Vernon Otter, former Idaho state engineer for the PWA, is project manager on construction of a new defense plant near Pocatello, Idaho.

Lt. Col. Peter P. Goerz has been appointed U. S. district engineer at Seattle, Wash., to succeed **Col. Beverly C. Dunn,** recently transferred to New York City.

Clyde Herberling, who resigned as Stevens county (Wash.) engineer in January to retire to his ranch, recently resumed his job, replacing **W. E. McKibben** who resigned to accept a post with the United Engineering & Foundry Co., Spokane.

Four Montana state highway department engineers recently accepted positions with Foley Bros., Inc., of New York, to aid in construction of defense highways in the Middle East. They are: **Leo E. Garrison,** structural designer in the bridge department; **Carl R. Berggren,** special design and landscape engineer; **S. D. Patterson,** chief chemist, and **Joseph A. Maierle,** structural designer.

Inside Information!

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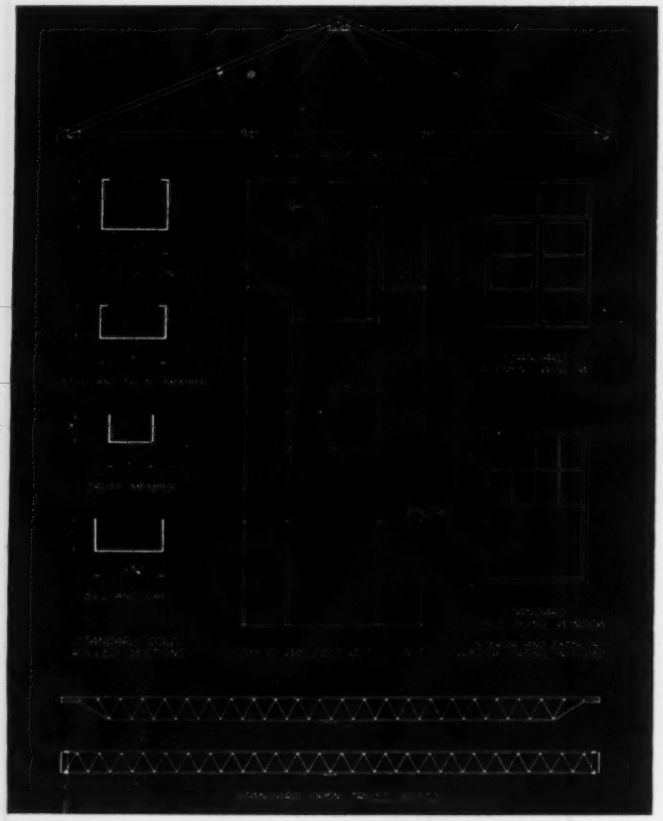

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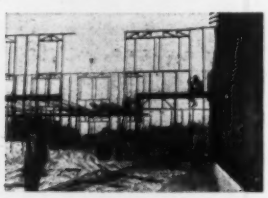
STANDARD OPEN TRUSS JOISTS—Joists are furnished either with or without wood nailers, depending on type of subfloor. They generally span the full width of building and are supported at the center by a bearing partition or standard plate girder type joists and steel pipe columns.

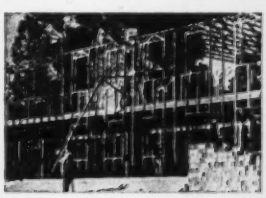
STANDARD METAL LATH—Diamond rib lath serves the double purpose of form for the concrete and reinforcing. Also used as a plaster base for walls and ceilings.

An Example of Truscon Light Steel Framing

First Floor Construction



Erection of Second Floor Joists

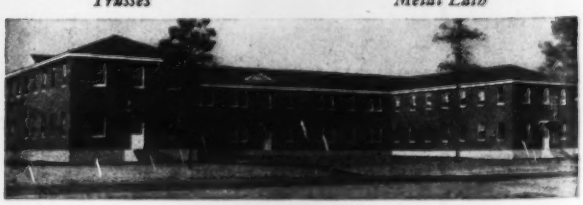


Erection of Standard Roof Trusses

Second Floor Framing and Metal Lath

Attaching Wall Sheathing

Diamond Rib Lath as Base for Plaster



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(Daily service also available—Write for details)

Location of ENR Correspondents

Symbols and Abbreviations Include

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering News-Record Construction Daily
A-E-M Architect — Engineer-Management type of contract.

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Named in order of Listing)

Water Supply	Unclassified
Sewers, Waste Disposal	Latin America
Bridges, Grade Cross'gs	Public Buildings
Streets & Roads	Commercial Buildings
Earthwork, Waterways	Industrial Buildings

Stages Reported

PROPOSED: (except Streets & Roads):

BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Note: To comply with censorship requirements, addresses on some reports are being generalized. Data which would reveal the purpose of the improvements and the size are withheld. The name of contractor and general area are reported.

WATER SUPPLY

PROPOSED WORK

D. C., Wash.—District Comrs., District Bldg., rejected bids Mar. 2, addn. remodeling Reno pump. sta., Donaldson St. N.W. $10,000. CD 2/20—ENR 2/26.

Ill., Toulon—Defeated $25,000 bonds, lake reservoir, filtering equip. CD 1/21—ENR 1/29.

†Ind., Fort Wayne—City, Wexten, $177,712. FWA.

†Ind., Odon—Town, c/o B. H. Heim, WW sys. addns. $90,074. FWA. L. S. Finch, 276 Century Bldg., Indianapolis, engr.

Mass., Worcester—H. Green, comr. P. Wks., City Hall, three 1 story, 20x25 ft., brick bldgs. to house chlorinating equip. $30,000. E. R. Perry, City Hall, engr.

★ **Mo., St. Louis**—City, c/o Bd. P. Serv., C. H. Ellaby, pres., 304 City Hall, 1 mg rein.-con. reservoir, Stacy Park, $1,400,000; bids soon underwater coal storage facilities, Chain of Rocks Water Works Plant on Mississippi River, $75,000. Dpt. P. Utilities, c/o M. H. Doyne, 311 City Hall, engr. CD 3/19—ENR 3/26.

O., Columbus—Underground water pump. station, northwest section city. $200,000. P. W. Maetzel, city engr.

†O., Vandalia—City, C. Senseman, mayor, water storage reservoir, overhead tank. $159,200. FWA. Finkhelmer & Associates, Nicholas Bldg., Toledo, engr. CD 3/12—ENR 3/14.

★ **†O., Warren**—City, 6 m.g. 54512 p.d.c. Water plant, Docket Ohio 33-188, $1,070,000. FWA. Havens & Emerson, Leader Bldg., Cleveland, engrs. CD 3/11—ENR 3/19.

★ **Okla., Oklahoma City**—R. A. Hafner, mayor, voted bonds water line. $864,000. R. Lee, City Hall, engr. CD 3/24—ENR 3/26.

†Rhode Island—Federal Works Agency, 18 and F Sts. N.W., Wash., D. C., water sys., Lawton Valley, Project 901, Contr. 1 and 2, Charles Maguire & Associates, 1515 Turks Head Bldg., Providence, engrs.

★ **Tex., Amarillo**—City, A. P. Hancock, mgr., WW exten., imprvs., $1,261,679. Applied to FWA. W. T. Hazlewood, Amarillo, engr. Freese & Nichols, Capps Bldg., Fort Worth, consult. engrs.

Tex., Angleton—City, C. B. Masterson, mayor, WW imprvs. and addns. $76,000. Applied for FWA funds. C. P. Smith, Orange, engr.

†Tex., Corpus Christi—Gulf Water Supply Dist., New Braunfels, WW, Tex. 41-490. $50,000. FWA.

†Tex., Corpus Christi—Nueces Co. Water Imprvt. Dist. 1, c/o D. Coover, 824 Jones Bldg., revised plans, new bids soon, WW imprvs., Tex. 41-260. $50,000. FWA. Myers & Noyes, Furman Bldg., engrs. CD 3/26—ENR 3/26.

†Tex., Garland—City, W. R. Olinger, mayor, voted bonds, bids soon, WW sys. imprvs., exten., Docket Tex. 41-470. $276,400. FWA. H. B. Gieb & Co., 1207 Texas Bank Bldg., Dallas, engrs. CD 4/21.

Tex., Greenville—Hunt Co., c/o Judge, bids soon laying 5½ mi. 8 in. water supply line. $49,000 bonds voted.

Tex., Houston (Galena Park Area)—Galena Oaks Co., D. H. Canterbury, 7447 Azalea St., Houston, water distr. lines, facilities, development area. $20,000.

Tex., Kingsville—WW sys. imprvs. $350,000. Applied for FWA funds. Peurifoy & Patterson, Box 1321, engrs.

†Tex., La Marque—Galveston Co. Water Control & Imprvt. Dist. 3, received no bids Apr. 15, WW elevated steel tank Tex. 41-265, $45,000. FWA. J. J. Rady, Majestic Bldg., Fort Worth, engr. CD 3/30—ENR 4/2.

Tex., Mineola — Voted $35,000 bonds water sys. CD 4/20—ENR 4/23.

Tex., Paris—City, J. M. Crook, mayor, WW sys. imprvs., $200,000. Applied for FWA funds. Rollins & Forrest, 817 Praetorian Bldg., Dallas, engrs. W. F. Hicks, Paris, consult. engrs.

Tex., Quitman—H. V. Puckett, mayor, voted $35,000 bonds WW sys. CD 4/20—ENR 4/23.

†Wash., Poulsbo—City, indefinitely postponed taking bids water supply and distr. sys. and sewerage sys. Docket 45-188. $98,000. FWA. Parker & Hill, Smith Tower, Seattle, engrs. CD 4/24—ENR 4/9.

Wis., Green Bay—Water Comn., returned unopened bids to have been opened Apr. 23, pump station, reservoir, pumps, etc. Will readvertise when priority rating is obtained. CD 4/7—ENR 4/9.

Ont., Sudbury—Gore & Storrie, engrs., 1130 Bay St., Toronto, bids soon altering David St. pumphouse, new equip., etc., for city. $48,500.

BIDS ASKED

Bids Asked May 15

†Tex., Grand Prairie—City, c/o G. H. Turner, mayor, water distr. sys. and imprvs. Tex. 41-373. $145,000. FWA. Burleson-Garrett Eng. Co., P.O. Box 788, engrs. CD 4/28—ENR 3/19.

Bids Asked May 17

†N. H., Portsmouth—City, Street Comrs., City Hall, Sherburne and Haven pump. stations addns., alterations. $15,000. FWA. Whitman & Howard, 89 Broad St., Boston, Mass., engrs. CD 4/21—ENR 4/22.

Bids Asked May 18

†Kentucky—U. S. Eng., P.O. Box 59, Louisville, manufacturing 25 sects. 20 in. I.D. 60 ft. lengths, and 25 sects. 24 in. I.D. 60 ft. lengths, electrically welded discharge pipe, adv. ENR 5/7.

Bids Asked June 3

†N. C., Wilmington—Mayor and City Council, Sects. 1 to 6 (inclusive) WW., Docket N. C. 31-119. FWA. W. C. Olesen, 5 Exchange Pl., Raleigh, consult. engr.; J. R. Benson, city clk. adv. ENR 5/7.

Bids Asked

†New Mexico—U. S. Eng., Albuquerque, waterlines, facilities, sanitary sewers, electric distr. sys., natural gas distr. sys.

LOW BIDDERS

†Ia., Middletown—City, Mar. 31, WW and sewerage sys., Ia 13-109, from Dan Christensen Constr. Co., 417 1 Ave. S.E., Cedar Rapids, $50,229. Est. $47,000. FWA. CD 3/11—ENR 3/19.

Michigan—Taylor Twp., c/o E. W. Orr, engr., 22148 Michigan Ave., Dearborn, Apr. 17, watermain extens., Taylor Twp., from Pietro Scalzitte, 3140 Linder Ave., Chicago, Ill. $145,000. CD 4/7—ENR 4/9.

†Mich., Flint—City, Apr. 20, watermain exten., Docket Mich. 20-101, Contr. 1, from L. W. Wells, Saginaw, $137,027. FWA. CD 4/14—ENR 3/5.

†Mississippi—U. S. Eng., foot of Prytania St., New Orleans, La., water distr. sys., etc., from J. R. Owens Co., 4011 1 Ave., North Birmingham, Ala.

†N. C., Swansboro—Town, Apr. 30, water supply sys., NC 31-147, from Elliot Building Co., Hickory. $28,123. Est. $66,000. FWA. CD 2/27—ENR 3/5.

†O., Dayton—Veterans Admin., Vermont Ave. between H and I Sts., Wash., D. C., Apr. 28, concrete water reservoirs, Proj. 1974, from Simpson Constr. Co., 1113 S. Hermitage St., Chicago, Ill., $27,400. CD 4/1—ENR 4/9.

†Tex., San Antonio—U. S. Eng., Fort Sam Houston, May 1, waterlines, facilities, also sewer lines from Wahrmund & Ligan, Builders Exchange Bldg., $40,124 and $47,013 respectively. CD 5/4.

†Va., Gravelly Point—Pub. Bldgs. Admin., 7 and D Sts. S.W., Wash., D. C., Apr. 28, reservoir and piping fire protection, from F. H. Martell Co., 920 17 St. N.W., Wash., D. C., $19,465. CD 4/23.

Wash., Seattle—Bd. P. Wks., County-City Bldg., Apr. 23, 11,495 ft. 8- to 30-in. c.i. pipe for airport way watermain, from H. G. Purcell Co., Colman Bldg., $123,395; 2 rein.-con. substation bldgs., for City Light Dpt., from Henrik Valle Co., 407 3 Ave. W. $59,781. CD 4/16.

†Alaska, Anchorage—City, Apr. 27, water distr. sys., Docket 50-115, from C. W. Hufeisen, Anchorage. $64,792. FWA. CD 4/1—ENR 4/9.

CONTRACTS AWARDED

★ **†California**—U. S. Eng., 74 New Montgomery St., San Francisco, water and sewer lines, to Maensons, 151 Tehama St., San Francisco; altering distr. sys., to American Electric Constr. Co., 462 Bryant St., San Francisco. Under $1,000,000 each.

★ **†California**—U. S. Eng., 74 New Montgomery St., San Francisco well drilling, to T. Garcia, R.F.D. 1, Box 25, Redwood City.

†Calif, Vallejo—Federal Works Agency, 408 S. Spring St., Los Angeles, water distr. lines, Calif. 4-126, Unit 3, Contr. 2, Bid 6-RE-53, to Underground Constr. Co., 354 Hobart St., Oakland, $38,130. Bids 4/24. CD 3/30—ENR 4/2.

Kan., Junction City — Exten. water supply and distr. sys. WPA. $35,000. M. Schmidt, supt. Water Dpt. CD 1/8—ENR 1/15.

†La., Shreveport—City, WW imprvts., Contr. 6, buildings and structures, and Contr. 7, pipe installation, Docket La. 16-105, to J. E. Hathman, Columbia, Mo., $37,869 and $26,925 respectively. FWA. CD 4/21—ENR 4/23.

Neb., Lincoln—City, WW, day labor under supervision, D. L. Erickson, city engr. $50,000. Bids 4/18 rejected. CD 4/30 under LB.

N. J., Pleasantville—Rein.-con. filters, bulkhead sheeting, etc., for water plant. WPA. $57,651. D. W. Halning, 930 Atlantic Ave., Atlantic City, WPA engr.

O., Painesville—Lake Co., water lines Erie St., to M. Valacchi, Painesville, $25,000. P. D. Cook, co. sanitary engr.

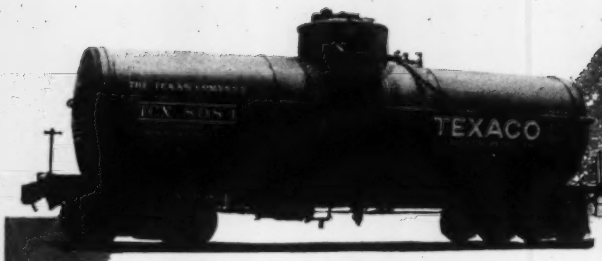
O., Racine—Water sys., WPA, $38,000. P. W. Elwell, 5005 Euclid Ave., Cleveland, engr.

†Ore., Pendleton—U. S. Eng., Pittock Blk., Portland, water lines and sewers, to Vernon Bros., Boise, Idaho.

†Pa., Glenshaw—Bd. Comrs. Shaler Twp., J. Wayne Thompson, secy., Box 38, Glenshaw, general contract water softening plant and pump. sta. Proj. Pa. 36155, Shaler Twp., near here, to C. Tanner, Box 138, South Hills Br., Pittsburgh, $41,471. FWA. Bids 3/27. CD 3/18.

†Washington—U. S. Eng., Textile Tower, Seattle, drill well, to R. S. McClintock, 418 2 St., Spokane.

†Wisconsin—U. S. Eng., Baraboo, filters and piping for water filter plant and pump sta., to Pitt Constr. Co., Inc., 1235 Washington Blvd., Pittsburgh, Pa. CD 4/28—ENR 4/30.



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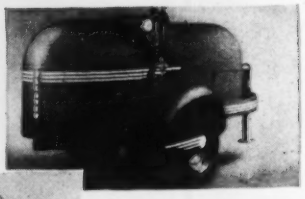

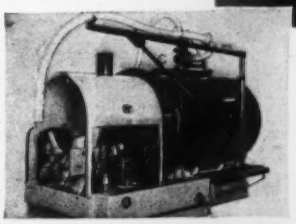

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WATER SUPPLY (Contracts Awarded, Cont'd.)

†**Wisconsin**—U. S. Eng., Federal Bldg., Milwaukee, temporary water lines, to Icke, Pankow & Conway, Madison; drilling wells, to Layne-Northwest Co., 709 N. 11 St., Milwaukee.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Calif., Fullerton — Sewage disposal plant. Over $25,000. G. L. Water, City Hall, engr.

Conn., Fairfield—Town, F. S. Shaw, chn. com., Mill Hill, Southport, brick, steel sewage disposal plant, incinerator and garage. Over $25,000.

†**Conn., Stratford**—Town, W. Shea, mgr., Town Hall, bids soon sewerage sys., Conn. 6-129. $400,000. **FWA.** F. F. Bowe, 110 William St., New York, N. Y., engr. CD 4/10—ENR 4/16.

Fla., Key West—W. M. Albury, mayor, incinerator, community clinic bldg. $100,000.

†**Ga., Macon**—City, incinerator, Docket Ga. 9-217. $80,439. **FWA.**

†**Ind., Fort Wayne**—Bd. P. Wks., R. G. Beams, chn., City Hall, bids soon sewers, Clay St. $177,712. **FWA.** C. McAnliss, city engr.

La., Westwego—Town, c/o H. N. Moody, 823 Presidio St., New Orleans, complete sewerage sys., extens. water sys. $310,000. Applied for FWA funds.

†**Ind., Franklin**—Bd. P. Wks., L. W. Oliver, mayor, chn., enlarging sewage disposal plant, $100,000; sewerage sys. exten. $120,000. **FWA.** Jno. W. Moore & Son, 830 Indiana Pythian Bldg., Indianapolis, consult. engr. CD 3/11—ENR 3/13.

†**Me., Kittery**—Federal Works Agency, F St. between 18 and 19 Sts., Wash., D. C., sewage plant, incinerator. $150,000. Haller Eng. Assn., Inc., 38 Memorial Dr., Cambridge, Mass., engrs.

Minn., Blue Earth—W. Enger, city clk., sewage plant for city wastes $63,000, interceptor sewers $36,000, plant for canning plant wastes $93,500. Toltz, King & Day, 1509 Pioneer Bldg., St. Paul, engrs.

Minn., Winnebago—Sewage disposal plant. $25,000. Toltz, King & Day, Inc., 1509 Pioneer Bldg., St. Paul, engrs.

†**Mississippi**—U. S. Eng., foot of Prytania St., New Orleans, La., received no bids Apr. 25, sewage treatment plant. CD 4/20.

N. J., Camden—Circular brick sewer Mt. Vernon and 3 Sts., et al. $86,644. WPA. D. W. Haining, 920 Atlantic Ave., Atlantic City, WPA engr.

N. J., Secaucus—Town, 8 in. vitr. tile sanitary sewers, etc. $58,500. WPA. C. Malstrom, Orange and N. 6 Sts., Newark, WPA engr.

N. Y., Bayside (sta. Flushing)—President Queens Boro, 120-55 Queens Blvd., Kew Gardens, storm sewer, Oceana St. from 46 to 48 Aves., etc. $250,000.

★**N. Y., Brooklyn**—President Brooklyn Boro, Boro Hall, relief sewers 17 Ave., 60 St. to Dahill Rd., $2,000,000; sewers Fairfield Ave., Autumn to Drew Aves., $1,000,000; Avenue M, Utica to Flatbush Aves., $150,000.

N. Y., Brooklyn—Dpt. P. Welfare, Municipal Bldg., New York, enclosed waterfront disposal station, 52 St. $200,000.

N. Y., Flushing—President Queens Boro, 120-55 Queens Blvd., Kew Gardens, storm sewer, 150 ft. from Peck Ave. to 60 Ave. and vicinity. $125,000.

★**N. Y., Richmond Hill**—President Queens Boro, 120-55 Queens Blvd., Kew Gardens, combined trunk sewers, Laurel Hill. $500,000.

O., Dayton—Suburban Conservancy Sanitary Dist., R. Pine, pres., Winters Bank Bldg., sanitary sewers, sewage disposal plant, Shakertown Pike, southeast of Belmont. $250,000. R. T. Parrish, U. B. Bldg., engr.

O., Kenton—Intercepting sewers, sewage pump. station. $30,295. P. Strong, city engr.

O., Upper Arlington—Village, 18- to 40-in. sewer lines. $75,000. Burgess & Niple, 568 E. Broad St., Columbus, engrs.

†**Okla., Muskogee** — City, sewage disposal plant, sanitary sewer facilities. $240,000. **FWA.** T. P. Clonts, Muskogee, engr.

†**Texas**—Dpt. Agriculture, c/o FSA, Parry and Commerce Sts., Dallas, bids soon sanitary sewers, $40,000; roads, walks, drives, drainage $40,000; water dist. sys. $26,000.

Tex., Dallas—Dallas County Arcadia Fresh Water Dist. 1, c/o C. E. Granger, Route 8, Box 460, storm sewers, $37,000; sanitary disposal plant, collecting lines $48,000. Applied for FWA funds. Myers & Noyes, Tower Petroleum Bldg., Dallas, engrs.

†**Tex., Fort Worth**—Tarrant Co. Water Control & Imprvt. Dist. 3, sewerage sys., Tex. 41-499. $270,000. **FWA.** J. J. Rady, Majestic Bldg., engr.

†**Tex., Garland**—City, voted bonds, bids soon, sanitary sewerage sys. exten., imprvs., Docket Tex. 41-461. $235,070. **FWA.** H. B. Gleb & Co., 1207 Texas Bank Bldg., Dallas, engrs. CD 4/21, under WW.

Tex., Houston (Galena Park Area)—Galena Oaks Co., D. H. Canterbury, 7447 Azalea St., Houston, sanitary sewer collecting lines, development area. $65,000.

Tex., Kingsville—City, sanitary sewerage sys. imprvs., $54,000. Applied for FWA funds. Peurifoy & Patterson, Box 1321, engrs.

Tex., Mineola—Voted $25,000 bonds, sewerage sys. CD 4/20—ENR 4/23.

Tex., Quitman—Voted $25,000 bonds, sanitary sewerage sys. CD 4/20—ENR 4/23.

†**Tex., Paris**—City, J. M. Crook, mayor, sewage treatment and sewer facilities, $200,000. Applied for FWA funds. Rollins & Forrest, 817 Praetorian Bldg., Dallas, consult. engr. W. F. Hicks, Paris, ch. engr.

†**Tex., San Antonio**—H. F. Hein, comr. Sanitation, etc., sewage treatment plant imprvs., Tex. 41-401. $85,000. **FWA.** H. R. F. Helland, Frost Natl. Bank Bldg., engr.

†**Tex., West University Place**—City, F. M. Mainous, mayor, revising plans sewer lines, Docket Tex. 41-24. $300,000. **FWA.** Bids 4/10, rejected. Garrett Eng. Co., 3504 Audubon St., Houston, engrs. CD 4/20—ENR 4/22, under LB.

Utah, Lehi—Sewage disposal plant. $200,000. Will apply for FWA funds.

★**Va., Newport News**—Sewage treatment plant, pump. station, force mains, outfall sewer, etc. $860,000. Federal grant requested. J. C. Biggins, Newport News, engr.

Va., Norfolk—Sewerage pump. station, rein.-con. force mains. $127,730. Federal gr. requested. W. H. Taylor, III, Norfolk, engr.

†**Wash., Vancouver**—City, south side interceptor sewer, trunk sewers along E. 10, E. 13 and E. 5 Sts. $200,000. **FWA** J. L. Henderson, City Hall, engr.

Wis., Manitowoc—3,500 lin. ft. 21 in. concrete intercepting sewer along Little Manitowoc River from Cleveland Ave. to Park View Lane. E. Walter, city engr.

BIDS ASKED

Bids Asked May 11

†**Conn., Bridgeport**—City, P. Brewster, dir. P. Wks., storm sewers, Evers Lane, Conn. 6-189. **FWA.** H. L. Rowland, City Hall, engr.

N. Y., Kew Gardens—President Queens Boro, Queens Boro Hall, 120-55 Queens Blvd., combined sewer appurtenances 80 Dr., 114 Dr., Dumfries Pl., 164 Pl., Tryon Pl., 157 St., Bascom Ave., etc.

Bids Asked May 13

La., Baton Rouge—Comn. Council, 290 lin. ft. 24 in. rein.-con. culvert pipe, catch basin. E. G. Blakewood, Jr., City Hall, engr.

Bids Asked May 14

†**Mo., Valley Park** — City, sewerage sys., Docket Mo. 23-142. $40,000. **FWA.** Caldwell Eng. Co., 803 W. College Ave., Jacksonville, Ill., engrs. CD 4/8—ENR 3/12.

†**Tenn., Milan**—J. M. Creswell, mayor, City Hall, general contract sewage treatment plant, Docket Tenn. 40-113. $90,000. **FWA.** W. L. Picton, 711 American Bank Bldg., Nashville, engr. CD 10/8—ENR 10/16.

Bids Asked May 16

★**Que., Montreal**—Executive Com., City Hall, Chester-Cote St. Luke Sewer, $750,000. Extended date. H. E. Eng. Div., 3161 Joseph St., Verdun, engrs. CD 4/13—ENR 4/16.

Bids Asked May 18

†**Mich., Detroit**—Wayne Co. Road Comn., 3800 Barlum Tower, 14,590 lin. ft. 72 in. sanitary interceptor sewer, Grosse Pointe, Docket Mich. 20-161. **FWA.** adv. ENR 5/7.

N. J., North Brunswick—Town, Town Hall, sewage disposal plant addn., sprinkling filters, 2 settling tanks, digestion tanks, etc. $194,000. H. R. Fleming, 9 Allen St., New Brunswick, engr.

†**Tex., Dumas**—City, F. S. Makeig, mayor, sewerage sys. extens., Tex. 41-340. $37,000. **FWA.** W. D. Howren, 800 Florida St., Amarillo, engr. CD 4/20—ENR 4/23.

Bids Asked May 20

†**Calif., Los Angeles**—City, City Hall, sanitary sewer, remodeling existing sewage pump.

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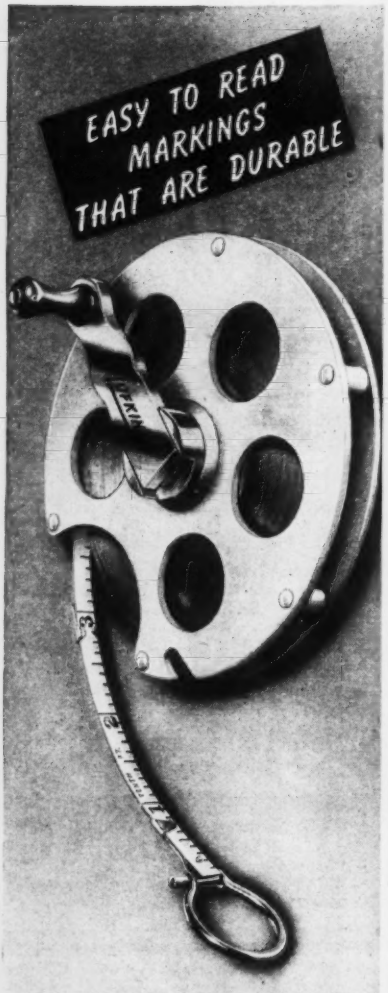

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SEWERS, etc. (Bids Asked, Cont'd.)

plant, Calif. 4-276. Over $25,000. L. Aldrich, City Hall, engr. CD 1/5—ENR 1/8.

Bids Asked June 2

†Va., Portsmouth—At office A. S. Owens, city mgr., sewers, Douglas Ave. and Race St. suction line extens., Docket VA. 44-141. **FWA.** L. C. Brinson, city clk. CD 1/30—ENR 2/5.

LOW BIDDERS

Conn., East Hartford (br. Hartford)—Town, Director P. Wks., Town Hall, Apr. 24, 6,000 ft. storm sewer, Mill Brook Park, from Ward Crane Service, Winsted. **$29,000.**

Md., Towson—Comrs. Baltimore Co., Court House, Apr. 27, 3,500 lin. ft. 6 and 8 in. vitr. sewer, Contr. 548, Edgewater, from Frank Angelozzi & Sons, 123 S. High St., Baltimore. CD 4/20—ENR 4/23.

Michigan—State Hy. Comn., Lansing, Apr. 22, pump house, mechanical and electrical equip., DA-WL-D1 of 81-20C-3 on U. S. 112, relocated (East Tri Level Grade separation) Washtenaw Co., from E. C. Nolan & Son, 56 W. Goldengate Ave., Detroit. **$50,872.** CD 4/16.

†Mich., Roseville—Village, 27,700 Gratiot Ave., Apr. 13, Sect. 1 sewer, Docket MICH 20-130, from A. Arcari, Lincoln Park. **$407,272. FWA.** CD 4/7—ENR 11/27.

Mich., Wyandotte—L. J. LaCourse, city clk., Apr. 21, 1,455 ft. 60 in. monolithic concrete trunk sewer, Goddard Rd. and 4 St., from Joseph Loquer, 400 Penobscot Bldg., Detroit. **$45,346.** CD 4/7—ENR 4/9.

★**†Oklahoma**—U. S. Eng., 416 Wright Bldg., Tulsa, Apr. 24, enlarging sewage treatment plant, from Skaggs Bros. Constr. Co., Oklahoma City. Under **$1,000,000.**

CONTRACTS AWARDED

Kan., Hutchinson—Sanitary sewers, to C. L. Burt, 515 W. 2 St. **$31,050.** Bids 4/14. H. P. Hertz, city engr.

†Mo., Valley Park—Sewage treatment plant, Docket Mo. 23-902, to E. A. Simon, 7526 Wydown Bldg., St. Louis. **$61,670. FWA.** Bids 4/15. CD 4/8—ENR 3/12.

†Nev., Las Vegas—Federal Works Agency, 408 S. Spring St., Los Angeles, Calif., main sewer lines, Docket Nev. 26-116, Unit 1, Contr. 1, to Werner & Webb, 1116 N. Mansfield Ave., Los Angeles, Calif. **$198,611. FWA.** Bids 4/29. CD 4/20—ENR 3/19.

†N. J., Pedricktown—Delaware Ordnance Depot., Pedricktown, drainage, sheeting, etc. **WPA. $133,731.** D. W. Haining, 930 Atlantic Ave., Atlantic City, WPA engr.

O., Lancaster—Sanitary sewer and water line extens., **WPA, $100,000.** W. W. Graf, city engr.

O., Medina—Medina Housing Corp., c/o W. R. Clarke & Son, 4341 Warner Rd., Cleveland, sewer and water lines, to M. Fatol, 355 E. 103 St., Cleveland. Est. **$60,000.**

†O., Mentor — City, sewage disposal plant, imprv. sewerage sys., to Huffman-Wolf Co., 669 N. High St., Columbus. Est. **$437,000. FWA.**

★**O., Newark**—Imprv. sewerage sys., erecting sewage disposal plant, **WPA. $2,000,000.** C. H. Wells, city engr. CD 6/5—ENR 6/19.

O., Toledo—Lucas Co., exten. storm and sanitary sewers. **WPA. $61,500.** L. Lewandowski, co. sanitary engr.

†Tenn., Milan—City, J. M. Creswell, mayor, sewerage sys., Docket Tenn. 40-113., to Volz Constr. Co., Dyersburg. Est. **$224,500. FWA.** CD 3/26—ENR 10/16.

Tex., San Antonio—C. K. Quinn, mayor, imprv. sewage treatment sys. **WPA. $85,000.** H. R. F. Helland, Frost Bldg., engr.

†Utah—U. S. Eng., 32 Exchange Pl., Salt Lake City, sewers, drainage, utility sys.; railroad tracks, roads, runways, etc. **WPA. $396,483.**

†Utah, Salt Lake City—Sanitary sewer, Redwood Rd.; Unit A, to W. E. Ryberg Co., Terminal Bldg., **$227,965. FWA.** Bids 4/16. CD 3/11—ENR 3/16.

BRIDGES, GRADE CROSSINGS

PROPOSED WORK

Ky., Draffin—Chesapeake & Ohio Ry. Co., I. L. Pyle, ch. engr., Richmond, Va., 3 span steel bridge over Russell Fork. Over $25,000.

†Minn., Brooklyn Center—War Dpt., 20 St. and Constitution Ave. N.W., Wash., D. C., and State Hy. Dpt., St. Paul, bridge over Mississippi River.

N. J., New Brunswick—Middlesex Co., Court House, 40x80 ft. rein.-con. bridge. $35,000. G. W. Merrill, Court House, engr.

N. Y., Forest Hills—President Queens Boro, 120-55 Queens Blvd., Kew Gardens, highway grade separation, Woodhaven Blvd. and Union Turnpike, $214,000; highway grade separation, Woodhaven Blvd. and Metropolitan Ave., $211,000.

North California — State Hy. & P. Wks. Comn., Raleigh, bids soon bridge across Meuse River, between Durham and Creedmoor, Project 4150, Durham and Granville Counties, $50,000-$75,000. W. V. Baise, Raleigh, engr.

Oregon—State Hy. Comn., Portland, rejected bids Apr. 30, bridge over South Umpqua River, Pacific Hy., North Dillard, Douglas Co., $160,000. CD 4/20.

BIDS ASKED

Bids Asked May 19

Calif., San Pedro—Los Angeles Co., Hall of Records, Los Angeles, grade separation structure over 5 St., Bandina Blvd. Over $25,000. E. F. Cooley, Hall of Records, Los Angeles, engr.

LOW BIDDERS

Calif., Seeley—C. H. Purcell, state hy. engr., State Bldg., Los Angeles, Apr. 21, timber bridge across New River, Imperial Co., from Thorston & Dahl, 163 Euclid Ave., Santa Monica. **$68,170.** CD 4/9.

Conn., New Haven—City, Apr. 28, steel deck and rebuilding east abutment bridge over Mill River, Chapel St., from C. W. Blakeslee & Son, Inc., 58 Waverly St., **$51,620.** Est. $50,000. CD 4/20—ENR 4/23.

Iowa—State Hy. Comn., Ames, Apr. 21, bridges, culverts, Polk Co., from E. A. Cramme Co., Inc., 402 Teachout Blvd., and Jensen Constr. Co., 1527 12 St., Des Moines. **$154,174.** CD 4/10—ENR 4/16.

Michigan—State Hy. Dpt., Lansing, Apr. 22, 3 span rein.-con grade separation, Wayne Co., from Andrew T. Barnes Cass City, **$43,995**; 6 span rein.-con. grade separation, Washtenaw Co., from Walter Toebe & Co., Munsing, **$130,959.** CD 4/15 and 4/16.

★**Ohio**—State Hy. Dpt., Columbus, Apr. 28, 1.791 mi. grade crossing elimination, Summit Co., from A. J. Baltes, 181 Benedict Ave., Norwalk. **$676,899.** Est. $678,800. CD 4/15—ENR 4/23.

O., Cleveland—Cuyahoga Co., Apr. 24, repairing Brooklyn-Brighton Bridge, from J. R. Bolton, 20 N. Wacker Dr., Chicago, Ill., **$45,500.** Est. $69,500. CD 3/31—ENR 4/2.

Tex., Lampasas—D. C. Greer, engr., State Hy. Dpt., Austin, Apr. 28, Lampasas River, Lampasas River Relief and Sulphur Creek bridges, Lampasas Co., from J. F. Buckner, Box 76, Cleburne, **$105,370.** CD 4/17—ENR 4/23.

★**Virginia**—State Dpt. Hys., Richmond, Apr. 23, making borings at site proposed bridge over York River, near Yorktown, Gloucester and York Counties, from Giles Drilling Corp., 18 E. 48 St., New York, N. Y., **$20,588.** Total est. $3,000,000. CD 4/14—ENR 4/16.

CONTRACTS AWARDED

Ia., Dubuque—City of Dubuque Bridge Comn., Contr. 7, East Dubuque entrance plaza, to Gund-Graham, Freeport, Ill., **$114,493***** Contr. 8, Dubuque entrance plaza imprvs., to Melburg & Taylor, Cedar Rapids, **$115,415***** Contr. 9, bldgs., Broadway lighting, to Ulrich Willy, 2160 Central Ave., **$8,061.** Grand total $310,969. Bids 4/23, awarded 4/27. CD 4/14—ENR 4/16.

West Virginia—State Road Comn., Charleston, South Charleston Overhead Bridge 1588, Kanawha Co., to Pochantas Constr. Co., Lewisburg, and Monty Bros., Charleston. **$398,539.** Bids 4/28. CD 4/17—ENR 4/23.

STREETS AND ROADS

PROPOSED WORK

★**Okla., Oklahoma City**—Oklahoma Co. voted bonds 38½ mi. access roads. $1,225,000. C. W. McFerron, Court House, engr.

BIDS ASKED

Bids Asked May 11

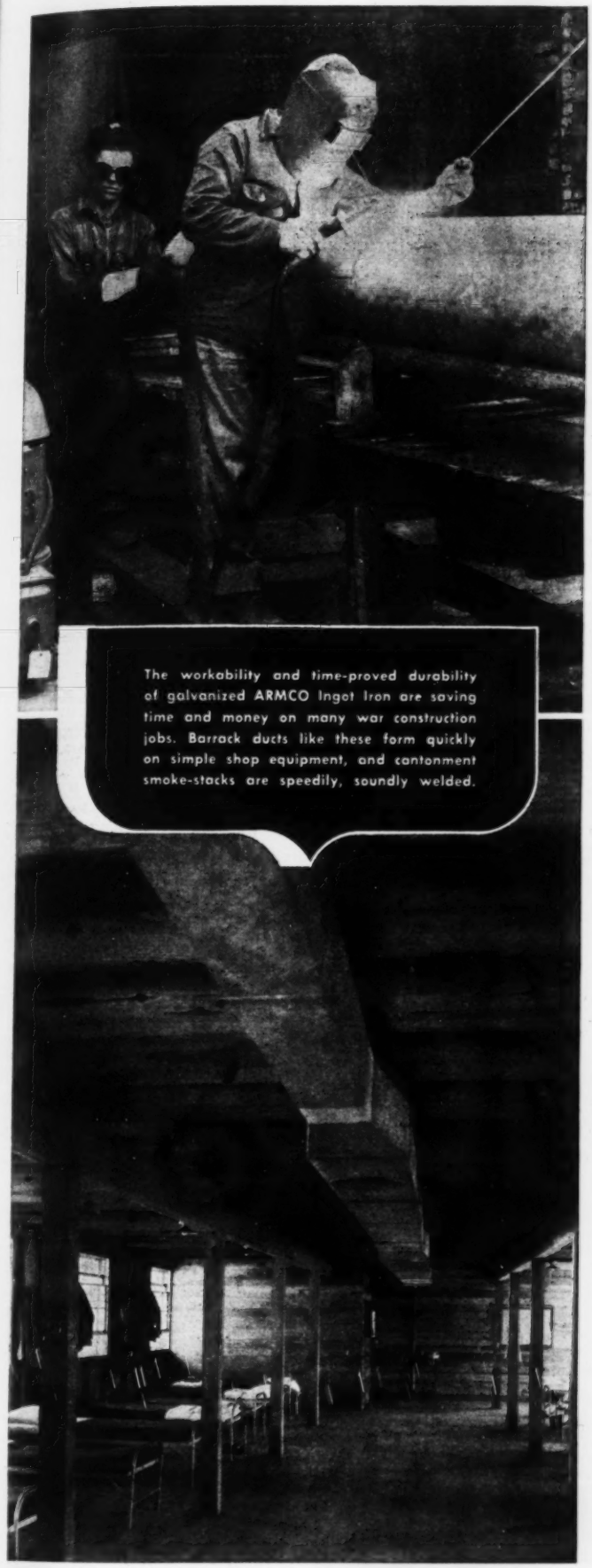
D. C., Wash.—District Comrs., District Bldg., imprv. roadway Wisconsin Ave. N.W. from R to 37 Sts. $86,000.

Bids Asked May 12

Indiana—State Hy. Comn., S. G. Hadden, chn., Indianapolis, bituminous retread surfacing or concrete paving 2.809 mi. State Rd. 45 from south to north Davies-Greene Co. line, Davies and Greene Counties; 4.643 mi. State Rd. 45, from south to north of C. M. & St. P. Ry., Martin and Davies Counties; 4.122 mi. State Rd. 45 from west of Scotland to east, Greene Co.; bituminous stabilized widening and bituminous surface treating 0.637 mi. Dutch Lane, Clark Co.; concrete paving 1.003 mi. 16 St. from Emerson to Arlington Aves., Marion Co.; 0.516 mi. from State Rd. 31 to east entrance Camp Atterbury, Johnson Co.; 0.688 mi. U. S. Rd. 35, La Porte Co. M. R. Keefe, ch. engr.

New York—President Brooklyn Boro, Boro Hall, Brooklyn, Cont. 3, grading, paving, utilities, walls, pedestrian bridge, Brooklyn-Queens Connecting Hy.

★**Ohio**—State Hy. Dpt., Columbus, asphaltic concrete resurfacing 2.916 mi. Sects. M, L and Barberton of SH 17, US 21, $29,120; grading, draining, concrete paving, continuous concrete slab bridge over Ohio Canal and roadside imprvs. 1.051 mi. Sect. Akron of SH 991, $337,750, both Summit Co.; asphaltic



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STREETS, etc. (Bids Asked, Cont'd.)

concrete resurfacing 4.579 mi. Sects. V, N and F of SH 18, Portage Co., $61,400; cold mixed cold laid asphaltic concrete resurfacing 2.673 mi. Sect. A SH 502, Mahoning Co., $27,100; bituminous premixed surface course resurfacing 3.218 mi. Sect. A SH 102, Belmont Co., $17,740.

West Virginia—State Road Comn., Charleston, grading, draining, concrete paving 0.624 mi. US Route 60, Longacre relocation, Fayette Co.; 2.332 mi. Culloden to Buffs Creek Rd., U.S. Route 60, Putnam Co.

Bids Asked May 14

Nebraska—State Dpt. Roads & Irrigation, Lincoln, sand gravel maintenance work Patrol 31026 and 31041 Wakefield-Emerson; Patrol 41004, 41005, 41006, 41019, Red Cloud south, Red Cloud-Superior, Guide Rock north, and Guide Rock south; Patrol 41043 and 41044, Ravenna-Sweetwater, Sweetwater-Loup City, Ravenna-Rockville and Rockville west; Patrol 41046, 41066, 41067, 41068, Walback-Genoa, Fullerton-Belgrade, and Fullerton-Albion; Patrol 41082 and 41084, Arcadia-Ord-Ericson; Patrol 41086 Arcadia-North Loup; Patrol 41092, St. Paul, Spaulding-Bartlett; Patrol 71010, Thedford-Dunning; Parcel 71014, 71019, 71020, Ansley-Sargent, Ansley-Loup City and Mason City north; Patrol 71015-71016, Westerville-Taylor, and Comstock west; Patrol 71022, Merna-Victoria Springs State Park-Anselmo; Patrol 71040, Dunning-Ainsworth; grading, culverts, roadside imprv., soil cement base course, prime coat, armor coat, mat, surface course, 4 bridges, 3.2 mi. oiled road, Millard-Wahoo; sand gravel surfacing 9.7 mi. Dickens-Wallace Rd., 661-D. W. G. Scott, state engr.

North Carolina—State Hy. & P. Wks. Comn., Raleigh, grading, sand asphalt paving 12.38 mi. N. C. Route 24, Project 2025, Carteret Co., $125,000-$150,000; grading, sand asphalt paving, structures 13.56 mi. N. C. Route 24, Project 3695, Onslow Co., roadway $50,000-$75,000, structures under $15,000; bridge and approaches 0.61 mi. long, over New River on N.C. 172, near Sneeds Ferry, incl. grading, sand asphalt paving, Project 3701, Onslow Co., structures $200,000-$225,000, roadway $15,000-$25,000; bituminous surface treating 6.49 mi. between Cabarrus Co. line and U.S. Route 21 in Mooresville, Project 423, Iredell Co., $25,000-$50,000. W. V. Baise, Raleigh, engr.

Wyoming—State Hy. Comn., Cheyenne, grading, draining, base course surfacing, stone chip seal coat, 2 treated timber bridges 3.5 mi. Hulett-Alladin Rd., Crook Co. J. E. Graham, Gillette, engr.

Bids Asked May 15

Wisconsin—State Hy. Comn., Madison, grading, draining, shale base, bituminous surfacing 13.062 mi. Sparta-U. S. Hy. 12 Rd., Camp McCoy-U. S. Hy. 12 Rd., Monroe Co.

Bids Asked May 16

†**North Carolina**—U. S. Eng., 308 Customhouse, Wilmington, grading, clearing, grubbing, drainage.

Bids Asked May 20

California—C. H. Purcell, engr. State Hy. Dpt., Sacramento, plant mix on gravel surfacing 2.7 mi. road between Loleta and Salmon Creek, Humboldt Co.

Louisiana—Dpt. Hys., Baton Rouge, concrete paving 4.472 mi. Belle-Chasse Hy., Orleans and Plaquemines Parishes.

†**Louisiana**—State Dpt. Hys., Baton Rouge, concrete paving 5 mi. hy. Federally financed.

Bids Asked May 21

California—C. H. Purcell, engr. State Hy. Dpt., 808 State Bldg., Los Angeles, grading, concrete surfacing hy. near Oxnard, Ventura Co. Over $25,000.

Bids Asked May 22

Kentucky—Dpt. Hys., Frankfort, grading, draining, surfacing 3.817 mi. Avon-U.S. 60 Rd., Fayette Co.; high type surfacing 7.849 mi. Elizabethtown-Munfordville Rd., Hardin Co., grading, draining, high type surfacing 5.018 mi. Munfordville-Elizabethtown Rd., Hart, Larue and Hardin Counties; traffic bound macadam paving 0.904 mi. Uniontown-Smith Mills Rd., Union Co.

Kentucky—Dpt. Hys., Frankfort, bituminous treating 8.6 mi. Rural Hy. Project 6, The Grants Lick School Bus Route 3; also 5.1 mi. Rural Hy. Project 25, both Campbell Co.

Minnesota—State Hy. Dpt., J. T. Ellison, ch. engr., bituminous materials and mineral aggregate on 3.4 mi. TH 13-13, S.P. 4002-16; 13.2 mi. S.P. 6607-14 and 15 TH 60-21 and S.P. 2511-06 and 07 TH 60-21; 6 mi. S.P. 7806-03 TH 75-6, S.P. 7805-14, TH 75-6 and S.P. 7803-02, TH 27-10; 1.6 mi. Project 02-502-10, AI-FAS 179 A (3) Anoka Co.

Bids Asked June 2

†**Tex., Legion**—Veterans Admin., Vermont Ave. between H and I Sts., Wash., D. C., resurfacing roads.

Bids Asked

North Carolina—State Hy. & P. Wks. Comn., Raleigh, rejected bids Apr. 16, grading, asphalt paving, structures 13.56 mi. P... Onslow Co., roadway $50,000-$75,00... under $15,000. Will readvertise. ... ENR 4/23 under LB.

North Carolina—State Hy. & P. W... Raleigh, rejected bids Apr. 16, ... mi. Iredell Co. $25,000-$50,000. ... vertise. W. V. Baise, Raleigh. ... 4/21—ENR 4/23, under LB.

Texas—D. C. Greer, engr. State ... Austin, rejected bids Apr. 10, im... mi. Montague, Wichita, Wilbarger ... Counties. CD 3/31—ENR 4/2.

LOW BIDDERS

California—C. H. Purcell, engr. ... Dpt., Sacramenta, Apr. 29, impr... Contra Costa Co., from Heafey-M... 344 High St., Oakland. $99,405. CD ...

Calif., San Francisco—S. J. He... Dpt. P. Wks., City Hall, Apr. 2... streets, for City and San Francisco ... Wells, The Planer, 1832 W. 9 St., ... $33,770. Est. $34,000. CD 4/24.

★**Iowa**—State Hy. Comn., Ames, ... paving 6.606 mi. DA-WI-3, Polk ... Fred Carlson Co., Decorah, $279,386; ... 2.774 mi. DA-WI-2 and 6.606 mi. DA-WI-3, Polk Co., from McCarthy Improvement Co., 601 Kahl Bldg., Davenport, $281,036 and $320,976 respectively. CD 4/10—ENR 4/16.

Kentucky—Dpt. Hys., Frankfort, May 1, imprv. 8.48 mi. Pulaski Co., from H. F. Mathis and R. E. Gaddie & Co., Harristown and Bowling Green, $192,901; 1.008 mi. Nelson and Larue Counties, from Kentucky Road Oiling Co., Louisville Pike, Frankfort, $48,173. CD 4/20—ENR 4/23.

Maryland—State Roads Comn., Baltimore, Apr. 28, imprv. 0.394 mi. Eastern Ave., Contr. BC 175-766, from Arundel Constr. Co., 910 Trinity St., Baltimore, $127,506; 0.3163 mi. Eastern Ave., Contr. BC 176-766, from P. Flanigan & Sons, 2505 Lock Raven Rd., Baltimore, $152,526. CD 4/22.

Md., Baltimore—Bd. Awards, City Hall, Apr. 22, sheet asphalt paving, from American Paving & Contg. Co., 2525 Loch Raven Rd., Baltimore. $79,523.

★**Michigan**—State Hy. Dpt., Lansing, Apr. 22, imprv. 1.46 mi. Washtenaw Co., from Bridgeport Core Sand Co., 125 Davenport St., Saginaw, $513,023***2.97 mi. Wayne Co., from Taylor Bros. Co., Inc., 790 Haynes St., Birmingham, $376,498***1.634 mi. Washtenaw Co., from Oak Constr. Co., 520 E. Lincoln Ave., Royal Oak, $176,654***0.38 mi. Saginaw Co., from P. Vander Veen & Sons, 259 Diamond Ave. S.E., Grand Rapids, $38,628***3.55 mi. Schoolcraft Co., from C. G. Bridges, Escanaba, $96,776***1.477 mi. Iron Co., from Herman Holmes, Crystal Falls, $56,853. CD 4/16.

Minnesota—State Hy. Dpt., St. Paul, Apr. 17, imprv. 11.2 mi. S.P. 0112-10, TH 65-5, from Zontelli-Herbison, Inc., Ironton, $32,395 ***7.5 mi. S.P. 4402, TH 31-108, from Ashworth-Hawkinson Co., St. Louis Park, $29,236 ***8.6 mi. S.P. 3502-09, TH 11-11, from J. W. Craig Co., 1801 California St. NE., Minneapolis, $46,090***8.2 mi. S.P. 2905-09, TH 71-4, from C. L. Nelson Co., Brainerd, and R. C. Jones, Deerwood, $47,326***6.2 mi. S.P. 1006-02 TH 25-25 and S.P. 1107, TH 25-25 also 10 mi. S.P. 3803, TH 1, from J. Roth Constr. Co., 350 W. Idaho St., St. Paul, and O. Brashe, 1115 15 Ave., S.E., Minneapolis, $44,191 and $32,486 respectively***18.7 mi. S.P. 0303-21, TH 34-34, from J. Meland, Hawley, $57,486***12 mi. S. 2 S.P. 1604, TH 61, from J. H. Ganley Co., 2336 Hampden Ave., St. Paul, $26,987***4.2 mi. Dist. 9, TH 212 and 31 mi. Dist. 14, TH 169, from Hector Constr. Co., Hector, $28,475*** 29.6 mi. Dist. 13, TH 65, from W. Hodgman & Sons, Fairmont, $27,457. CD 4/1—ENR 4/9.

Minn., Willmar—E. H. Brogen, city clk., Apr. 13, bituminous paving, from Duininck Bros. & Gilchrest, Olivia, $45,309.

Missouri—State Hy. Comn., Jefferson City, Apr. 24, imprv. 3.269 mi. Newton Co., from J. M. Roarke & Poole Constr. Co., Anderson. $318,594. CD 4/8—ENR 4/16.

★†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, Apr. 28, road and channel construction and sewerage sys., from Abel Constr. Co., 900 N. 16 St., and Dobson & Robinson Const. Co., 823 1st Natl. Bank Bldg., both Lincoln, $2,564,500 and $136,431 respectively ***culvert pipe for roads and channel excav., from G. H. Lowe and R. Green, 207 2 Ave. S. W., Cedar Rapids, Ia. $504,703***bridge, from Liggett & Knapp Const. Co., Lincoln. $104,131.

†**North Carolina**—U. S. Eng., Charlotte, Apr. 30, roads, drainage, Inv. 231-42-103, from R. B. Tyler Co., 1446 Levering St., Louisville, Ky. CD 4/21, under Public Bldgs.

Oregon—State Hy. Comn., Portland, Apr. 30, Lebannon-Sweethome rock production project Santiam Hy., Linn Co., from A. H. Saxton, Corvallis, $32,100; crushed rock for road, Clatsop Co., from Tidepoint Co., Astoria, $39,325. Received no bids Apr. 30, imprv. 5.56 mi. road north of Corvallis, Benton Co.; also rock production project north of Monmouth, will readvertise. CD 4/20—ENR 4/23.

Tennessee—State Hy. Dpt., Nashville, May 1, imprv. 6.988 mi. Henry Co., from F. C. Gor-

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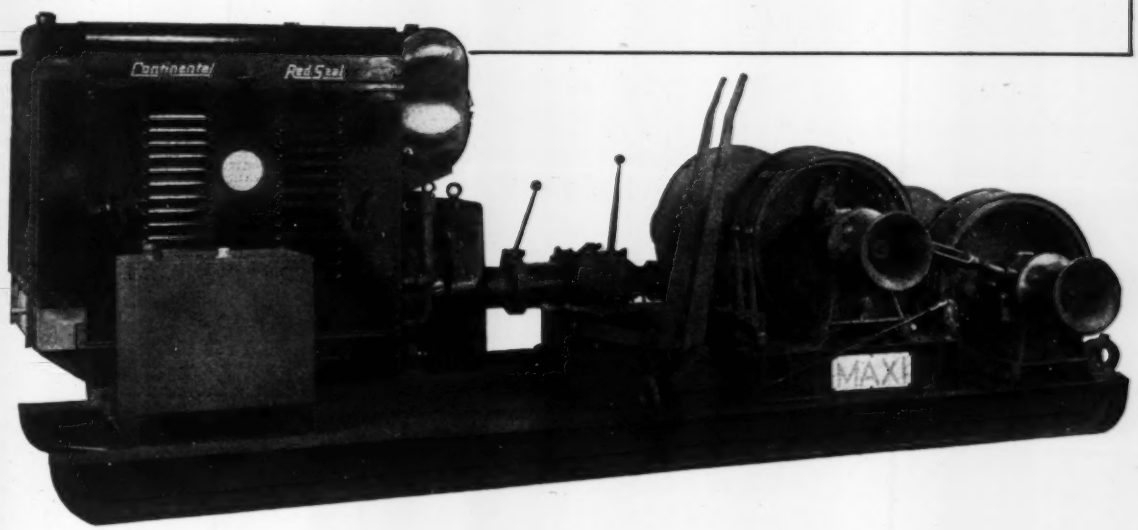

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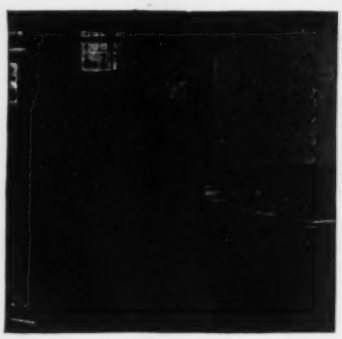

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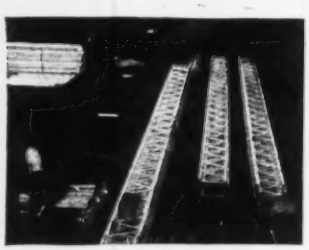

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STREETS, etc. (Low Bidders, Co... rell & Son, Russellville, Ky., $... 4/20—ENR 4/23.

★**Texas**—D. C. Greer, engr. Sta... Austin, Apr. 28, imprv. 6.461 m... Co., from Cage Bros. & L. A. Tu... **$186,138**, est. $161,800***7.561 mi... from Heldenfels Bros., Rockpo... est. $173,200***8.722 mi. Nueces... Brown & Root, Inc., P. O. Box ... **$160,256**, est. $176,700***5.373 mi... from H. B. Zachry, Laredo, $140,5... 700. Cancelled bids to have been ... 28, imprv. 11.364 mi. Hays Co. ... Caldwell Co.; 16.55 mi. Hays a... Counties. CD 4/17.

†**Texas**—U. S. Eng., Fort Sam H... 28, 245,274 sq. yd. asphalt and conc... concrete curbing, gutters. W 2161-... Republic Constr. Co., Denton, $14... crete paving 165,629 sq. yd. road ... Road Co., 1813 Clarence St., Dalla...

CONTRACTS AWARDED

★†**California**—U. S. Eng., 74 N... gomery St., San Francisco, roa... N. M. Ball Sons, 852 Carmel St., A... than **$1,000,000.**

★†**California**—U. S. Eng., 74 N... gomery St., San Francisco, roadwork, to A. Madonna, 759 Monterey St., San Luis Obispo.

Calif., Burbank—Grading, paving, ... bourn Ave., to Southwest Paving ... Tuxford St., Roscoe. **$87,864.** CD 4/16.

Calif., San Francisco—Dpt. P. Wks., City Hall, reconstructing streets, grading, replacing pavements, etc., Union Sq. area, for City and San Francisco Co., to Fay Improvement Co., Phelan Bldg., approx. **$26,165.**

†**Calif., San Francisco**—U. S. Eng., 74 N... Montgomery St., imprv. roadway, Inv. ... 186, to I. C. Smith, 1 and Railroad St... Mateo.

†**Florida**—U. S. Eng., 240 U. S. Courthouse and Post Office, Jacksonville, street and sewer imprvs., **WPA. $234,365.**

★**Georgia**—State Hy. Comn., W. E. Wilburn, chn., imprv. 8.222 mi. Chattanooga ... Claussen-Lawrence Constr. Co., Augusta, W. L. Cobb Constr. Co., Decatur, and Coffee Constr. Co., Eastman, **$1,001,103.** Bids 4/17. CD 4/... —ENR 4/30, under LB.

Ia., Grundy Center—Grundy Co., graveling roads, to Beu & Sons, Sumner. **$37,146.** J. W. Wiersma, co. engr.

Ia., Waterloo—Black Hawk Co., 33½ mi. grading, 30 mi. graveling, 18 wood trestle bridges, day labor, **$230,000.** R. L. Stevenson, co. engr.

Ia., Winterset—Madison Co., grading roads, to E. V. Martin, 2507 E. 28 St., Des Moines, **$34,678.** S. G. Agnew, co. engr.

★†**Mississippi**—U. S. Eng., foot of Prytania St., New Orleans, roads, drainage, motor parking areas, grading, etc., to Shuptrine Constr. Co., Hattiesburg. **$901,454.** Awarded 4/23. CD 4/14—ENR 4/16, under LB.

★†**Nebraska**—U. S. Eng., 1700 Jackson St., Omaha, roads and sewage facilities also fencing, to Inland Constr. Co., 3867 Leavenworth St., Omaha, **$562,804** and **$199,739** respectively. Bids 4/25.

★†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, roads, surfacing, etc., to Inland Constr. Co., 3867 Leavenworth St., Omaha, under **$1,000,000.**

N. J., Jersey City—Hudson Co., Court House, grading, 3 in. asphalt surfacing on 7 in. concrete roads, **WPA. $85,000.** C. Malstrom, Orange and N. 6 St., Newark, WPA engr.

N. J., Long Branch—Grading, paving, curbing, sidewalks, etc. Liberty St. from Broadway to Chelsea Ave., to Joseph Nesto & Co., 872 Broadway, Newark, **$51,816.**

N. J., Wanaque—North Dist. Water Supply Comn., Wanaque, grading, constructing access patrol roads around reservoir, **WPA. $100,000.** C. Maltrom, Orange and N. 6 Sts., Newark, WPA engr.

★**Ohio**—State Hy. Dpt., Columbus, imprv. 3.671 mi. Preble Co., to W. L. McGaw, Hawkins Rd., Richmond, Ind., **$36,903**, est. $39,100***4.425 mi. Clinton Co., to Clinton Constr. Co., Wilmington O., **$29,368** est. $32,900 ***31.73 mi. Portage Co. and 30.76 mi. Mahoning Co., to Troyer Contg. Co., Aurora. **$41,859** and **$37,778** respectively, est. $41,958 and $38,016 respectively***41.62 mi. Jackson's Pike, Ross and Vinton Counties, to Middle States Bituminous Corp., Box 267, Ironton, **$35,945**, est. $37,827***32.22 mi. Sandusky and Seneca Counties, to Modern Constr. Co., Elko Bldg., Fremont, **$34,496**, est. $34,805***64.91 mi. Adams, Brown and Highland Counties, to Southern Ohio Quarries Co., 150 E. Broad St., Columbus, **$46,493**, est. $51,134***19.97 mi. Butler, Hamilton, Warren and Montgomery Counties, to L. P. Cavett Co., 511 Shepherd Ave., Lockland, O., **$41,445**, est. $43,631***17.22 mi. Clermont, Clinton and Warren Counties, to C. J. Nible, New Vienna, **$37,776**, est. $37,816 ***42.31 mi. Fulton, Lucas and Henry Counties, to F. R. Creager, 708 Maple Ave., Liberty Center, **$26,264**, est. $26,867***43.63 mi. Fulton,

STREETS, etc. (Contracts Awarded)

Henry and Williams Counties, to P. S. Ward, Leipsic **$29,046**, est. $29,271*** 33.79 mi. Allen, Van Wert and Paulding Counties, to Union Quarries Co., 509 W. Main St., Van Wert, **$32,466**, est. $35,888***59.82 mi. Coshocton, Guernsey, Knox, Muskingum and Perry Counties, to C. J. Skelly, Thornville, **$77,964**, est. $78,124***7.168 mi. Fairfield, Licking, Perry and Knox Counties, to T. D. Van Camp & Sons, 1385 Norton Rd., Columbus, **$59,929**, est. $41,958. Grand total $567,732. Bids 4/29, awarded 4/29. Received no bids Apr. 28. Improv. 4.929 mi. Portage and Trumbull Counties, $500,000; 0.494 mi. Portage Co., $3,600. CD 4/15—ENR 4/23.

O., Lisbon—Columbiana Co., bituminous surface treating roads, to Ohio Tar & Asphalt Co., 3060 21 St. S.W., Canton, **$51,255**. Bids 4/24. C. O. Snyder, co. engr.

O., Massillon—Massillon Conservancy Dist., G. W. Hostetter, chn., asphalt repaving Tremont Ave. SE, to General Asphalt Paving Co., Kahler Bldg., Canton. **$40,705**. Est. $50,000. C. E. Rice, Massillon, engr.

★**Pennsylvania**—State Hy. Dpt., Harrisburg, impry 21,160 ft. Fayette and Somerset Counties, to Hinman Bros. Constr. Co., 314 Investment Bldg., Pittsburgh, **$1,511,438**. Bids 4/10. Awarded 4/27. CD 4/13—ENR 4/16. under LB.

★**Pennsylvania**—State Hy. Dpt., Harrisburg, resurfacing 3,500 mi. hys. in Dist. 1 Franklin, Dist. 2 Clearfield, Dist. 3 Williamsport, Dist. 4 Scranton, Dist. 5 Allentown, Dist. 6 Ardmore, Dist. 8 Harrisburg, Dist. 9 Hollidaysburg, Dist. 10 Indiana, Dist. 11 Pittsburgh, Dist. 12 Uniontown, own forces. **$3,200,000**. T. C. Frame, ch. engr.

Pa., Brentwood—Boro Council, H. Fairfield, pres., Municipal Bldg., 3624 Brownsville Rd., Brentwood, Pittsburgh, concrete paving, curbing Tuxey Ave. and Wainwright St., to D. Carapellucci Co., 130 Maytide St., Pittsburgh, **$28,709**. R. A. Schneider, 2704 Brownsville Rd., Pittsburgh, engr.

†**Texas**—U. S. Eng., Moore Bldg., roads, sidewalks, W-2161-42-38, to A. M. McNeal, Builders Exch. Bldg., San Antonio, **$59,713**. Est. $70,000. Bids 4/18.

Tex., Pampa—City and Gray Co., reconstructing, improv. roads, streets, sidewalks, curbs, gutters, etc., **WPA. $127,917**.

West Virginia—State Road Comn., Charleston, improv. 1.344 mi. South Charleston streets, Kanawha Co., to McHugh Bros., Springfield, O., **$296,278**. Bids 4/28. CD 4/17—ENR 4/23

★**Wisconsin**—State Hy. Comn., Madison, improv. Contr. 2, Madison-Wisconsin Dells Rd., Sauk City-Baraboo Rd., Sauk Co., to N. M. Isabella, 2245 Eton Ridge, Madison, **$540,221**. Bids 4/17. CD 4/21—ENR 4/23, under LB.

EARTHWORK, WATERWAYS

PROPOSED WORK

Ia., Waterloo—W. A. Reed, chn. City Comn., improv. Cedar River water front. $15,000.

S. D., Rapid City—C. I. Leedy, city aud., Deerfield Dam to conserve water. $15,000. Applied for FWA funds.

S. D., South Sioux Falls (mail Sioux Falls)—Plans bond issue, drainage sys. to prevent flood conditions. $15,000.

Wis., Milwaukee — Harbor Comn., H. C. Brockel, mgr., dredging various Milwaukee rivers. $16,000.

BIDS ASKED

Bids Asked May 18

†**Calif., Santa Barbara**—U. S. Eng., 751 S. Figueroa St., Los Angeles, dredging 440,000 cu. yd. material, Santa Barbara Harbor and place along approx. 4,000 lin. ft. of beach, No. 382. Over $25,000.

Louisiana—State Parks Comn., 126 Civil Court Bldg., New Orleans, (1) completing closing of dam at Bayou Chicot, 400 cu. yd. earth, 2,100 ft. topping and repair, 60 lin. ft. timber wakefield sheet piling, (2) approx. 75 lin. ft. vertical timber drainage gate cribbing, Chicot State Park, Evangeline Parish.

Michigan—District Engr., 700 Union Guardian Bldg., Detroit, 2 pairs steel lock gates; adv. ENR 5/7.

Bids Asked May 19

†**Kan., Leroy**—U. S. Eng., 416 Wright Bldg., Tulsa, Okla., constructing 14,000 net cu. yd. levee embankment on Neosho River, near here, Coffey Co.

Bids Asked May 16

La., Opelousas — Bd. Comrs. Bellevue & Coulee Croche Gravity D.D. 20, F. Dimmick, pres., Opelousas, gravity drainage sys., 532,060 cu.yd. earth, for City, Morgan Goudeau, Jr., Opelousas, engr.

LOW BIDDERS

†**Illinois**—U. S. Eng., 520 Merchandise Mart, Chicago, Apr. 18, removal and disposal about 476,000 cu. yd. scow measurement material

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EARTHWORK, etc. (Low Bidders, Cont'd.)

other than ledge rock from Indiana Harbor Canal and Entrance Channel, Inv. 1088-42-189, from Great Lakes Dredge & Dock Co., Gas Bldg., 122 S. Michigan Sts., Chicago. **$241,439.** CD 4/14—ENR 4/2.

N. Y., Brooklyn—President Brooklyn Boro, Boro Hall, Apr. 27, dredging Newtown Creek Canal and basins, from Joseph McSpirit & Son, Inc., 40 Glenwood Ave., Jersey City, N. J. **$38,940.** CD 4/20—ENR 4/23.

†Tex., Houston—U. S. Eng., U.S.P.O. Customhouse & Courthouse, Galveston, Apr. 27, dredging 3,636,000 cu. yd. material from Ship Channel, from Atlantic Gulf & Pacific Co., 15 Park Row, New York, N. Y., **$207,661.** CD 4/7—ENR 4/9.

Wash., Tacoma—Bd. Contrs. & Awards, City Hall, Apr. 27, twelve 115 kv. oil circuit breakers for tideflats substation, from Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., **$162,583.** CD 3/30—ENR 4/2.

CONTRACTS AWARDED

†Calif., San Diego—U. S. Eng., 751 S. Figueroa St., Los Angeles sea wall, No. 372, to V. R. Dennis Constr. Co., P. O. Box F, Hillcrest St. **$30,975.** Est. $27,000. Bids 4/29.

Ill., Mattoon—Mattoon Sanitary Dist., Mattoon, Riley Ditch cleaning and draining project, to Walker Constr. Co., Mattoon; Ill., Young & Greenwalt, 1000 E. 148 St., East Chicago, Ind., and Charles Tuttle, Jr., Metcalf, Ill., over **$15,000.**

N. J., Newark—Essex Co., 115 Clifton Ave., flood control, various parks, **WPA.** **$40,500.** R. D. Crater, 115 Clifton Ave., engr.

★**†Tex., Denison**—U. S. Eng., Citizens Bank Bldg., 178,000 bbl. cement, for Denison Dam, to Oklahoma Portland Cement Co., Perrine Bldg., Oklahoma City, Okla., **$402,420;** approx. 25,000 long tons reinforcing steel, to Sheffield Steel Co., Gulf Bldg., Houston, **$104,880.** Awarded 4/28. CD 4/—ENR 4/9.

†Washington—U. S. Eng., Textile Tower, Seattle, dredging, to General Constr. Co., 3840 Iowa St., Seattle.

★**Wash., Tacoma**—Bd. Contrs. & Awards, City Hall, 206,000 bbl. cement for dams second Nisqually power development, to Olympic Portland Cement Co., Ltd., Dexter Horton Bldg., Seattle, **$425,300;** 394,000 bbl. to Superior Portland Cement, Inc., Seaboard Bldg., Seattle, **$811,640.** Bids 4/6—CD 4/1.

UNCLASSIFIED

PROPOSED WORK

★**†Arizona**—IMPROVEMENTS—U. S. Eng., Albuquerque, N. M., improvements. $2,500,000.

†Arkansas—IMPROVEMENTS—U. S. Eng., Camden, improvements. Walk C. Jones Sr. and Jr., Sterick Bldg., Memphis, Tenn., archts. CD 4/8—ENR 4/16.

★**†Arkansas**—IMPROVEMENTS—U. S. Eng., Helena, improvements. Walk C. Jones Sr. and Jr., Sterick Bldg., Memphis, Tenn. archts.

★**†Arkansas**—IMPROVEMENTS—U. S. Eng., Pine Bluff, improvements. Walk C. Jones, Sr. and Jr., Sterick Bldg., Memphis, Tenn., archts.

California — IMPROVEMENTS — California Marine Industries, Inc., Newport Beach, C. J. Rambo, pres., 1824 W. 9 St., Los Angeles, imprvs., bldgs., bulkheads, etc. $70,000.

★**Calif., San Luis Obispo**—AIRPORT—City, airport. $500,000. CAA. L. Lengler, City Hall, engr.

★**Idaho** — IMPROVEMENTS — U. S. Eng., Pittock Blk., Portland, Ore., improvements. $5,000,000.

Ind., Decatur — TRACKS, etc. — Pennsylvania R.R., I. W. Geer, ch. engr. (Western Region), Union Station, Chicago, Ill., new tracks, switch yards. $75,000.

★**†Iowa**—IMPROVEMENTS — War Dpt., 20 St. and Constitution Ave. N.W., Wash., D. C., imprvs. depot. Over $1,000,000.

Ia., Ames—AIRPORT—Voted $90,000 bonds, airport. CD 4/21—ENR 4/23.

†Ia., Des Moines — STRUCTURES — U. S. Eng., 1709 Jackson St., Omaha, Neb., structures, Iowa State Fairgrounds. Federally financed.

★**†Kansas**—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, Neb., improvements. Over $5,000,000. Burns & McDonnell, 107 W. Linwood Blvd., Kansas City, Mo., engrs.

†Maine—PIERS, etc.—South Portland Dry Dock & Repair Co., South Portland, piers and bulkhead, for Navy Dpt. F. R. Harris, 27 William St., New York, N. Y., engr.

†Maryland — GASOLINE FUELING SYSTEM—U. S. Eng., Standard Oil Bldg., Baltimore, bids soon, A.C. gasoline fueling sys., No. 174-42-171.

★**Mass., Orange**—AIRPORT—A. C. S. Raymond, chn. Town Bd. Selectman, irport. $750,000.

†Missouri—IMPROVEMENTS—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., improvements. Over $150,000.

★**Mo., Columbia**—AIRPORT—R... Barrett, mayor, exten., imprv. airport. $500,000.

Neb., Fremont—RUNWAY SU...ACING—Hardsurfacing runways. $130,0... Applied for federal funds. L. M. Roessler, ...engr.

★**†New Jersey** — IMPROVEMEN... — U. S. Eng., Fort Dix, Wrightstow... improvements. $98,150. WPA. W. D. Cou... Chesnut and Hamilton Aves., Trenton, WP... gr.

N. Y., Brooklyn—COMFORT ...ATION—President Brooklyn Boro, Boro Ha... comfort station, Bay Ridge Area. $80,700.

N. Y., Olean—OIL DEVELOPM...T—Minich Bros., Duke Center, Pa., cr... oil development, drilling 30 or more ... wells, connecting and gathering pipelines, ... tank storage facilities, pump. equip., et... 25 acre tract, Humphreys, near here. ...000 or more.

★**N. Y., New York** — PIERS, ... — Dpt. Docks, Pier A, North River, ... Piers, sheds for Piers 75, 77 and 80, North River, $5,000,000.

★**N. Y., Stapleton (sta. Staten Island)**—SHEDS—Dpt. Docks, Pier A, North River, New York, shed, $200,000; bulkhead storage building, $500,000, both on Pier 14, Foreign Trade Zone.

★**†North Carolina**—IMPROVEMENTS—U. S. Eng., 308 Customhouse, Wilmington, imprvs. Over $3,000,000.

★**Ohio**—ELECTRIC LINES—Lorain-Medina Rural Electric Co-op., Inc., H. Bovard, supt., Wellington, 166 mi. electric lines, Lorain Co. $671,000.

★**Ohio**—ELECTRIC LINES—Paulding-Putnam Electric Co-operative, Inc., H. K. Monroe, mgr., Paulding, 551 mi. electric lines, Paulding Co. $538,000.

Ore., Bend—AIRPORT—B. C. Boylan, city clk., bids soon airport imprvs., Butler Rd. $25,000 bonds voted.

†South Carolina—IMPROVEMENTS—U. S. Eng., Post Office Bldg., Savannah, Ga., rejected bids Apr. 24, clearing, grading, drainage, fencing, sodding, Circ. Pro. No. 819-42-188. Will readvertise. CD 4/21.

†Tennessee—RIVER TERMINAL — Tennessee Valley Auth., Knoxville, river terminal, warehouses, docks. $180,000 federal gr. applied for.

†Texas—IMPROVEMENTS—U. S. Eng., Federal Bldg., Galveston, improvements. $250,000.

†Tex., Garland — ELECTRIC DISTRIBUTION SYSTEM—City, voted bonds, electric distr. sys. imprvs., exten., Tex. 41-462. $104,500. **FWA.** H. B. Gieb & Co., 1207 Texas Bank Bldg., Dallas, engrs. CD 3/26—ENR 3/26.

★**Wash., Seattle** — DAM — E. R. Hoffman, city light supt., City Light Bldg., raising height Ross hydroelectric dam. $8,300,000. City Council considering proposal of Light Dpt. for issuance and sale of bonds to finance project, without federal aid. CD 4/14—ENR 4/16.

★**†Wyoming**—IMPROVEMENTS—U. S. Eng., 1 and Douglas Sts. N.W., Wash., D. C., improvements. Over $5,000,000.

★**Alberta**—OIL WELLS—McColl Frontenac Co., Ltd., Notre Dame St. E., Montreal, Que., drilling 10 oil wells, probably southeastern Alberta. $800,000.

BIDS ASKED

Bids Asked May 11

†New York—IMPROVEMENTS—U. S. Eng., 120 Wall St., New York, improvements, Inv. 1097-42-241.

Bids Asked May 12

Man., Macdonald — AERODROME DEVELOPMENT — Secretary Dpt. Transport, Ottawa, Ont., aerodrome development, hard-surfaced runway extens., taxi strips, draining. $150,000.

Man., Paulsen—AERODROME DEVELOPMENT—Secretary Dpt. Transport, Ottawa, Ont., aerodrome development, hard-surfaced runway extens., taxi strips, draining. $150,000.

Que., Montreal — WHARF — Secretary National Harbors Bd., West Blk., Ottawa, Ont., closing gap in wharf, earth fill and concrete construction, Sect. 56, Montreal Harbor. $150,000.

Bids Asked May 14

†Me., Winterport—IMPROVEMENTS—U. S. Eng., Park Square Bldg., Boston, Mass., improvements. CD 3/6—ENR 3/12.

†New York—IMPROVEMENTS—U. S. Eng., 120 Wall St., New York, improvements.

★**†Tennessee** — IMPROVEMENTS — U. S. Eng., Federal Bldg., Nashville, imprvs., bldgs. Over $5,000,000. Warfield & Keeble, Nashville Trust Bldg., Nashville, archts. CD 4/29.

LOW BIDDERS

†D. C., Wash.—STEAM DISTRIBUTION SYSTEM—U. S. Eng., 1 and Douglas Sts. N.W.,

UNCLASSIFIED (Low Bidders, Cont'd.)

Apr. 23, furnishing, installing vacuum steam distr. sys., Spec. 977-42-209, from Crockett Eng. Co., Inc., Bethesda, Md. **$84,165.**

†Iowa—ELECTRIC DISTRIBUTION SYSTEM—U. S. Eng., 1709 Jackson St., Omaha, Neb., Apr. 17, electric distr. sys., from Clifton Eng. Co., Three Rivers, Mich. **$54,204.** CD 4/10.

★ **†Kansas**—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, Neb., Apr. 23, improvements, from Koss Const. Co., 205 Old Colony Bldg., Des Moines, Ia., approx. **$2,000,000.** CD 4/17.

†Kentucky—IMPROVEMENTS—U. S. Eng., Post office, Louisville, imprvs., from Brooks Constr. Co., 1123 Barthold St., Fort Wayne, Ind. **$401,736.** CD 4/7—ENR 3/5.

†Md., Middle River (br. Baltimore)—ELECTRIC DISTRIBUTION SYSTEM—Farm Security Admin., The Mall between 12 and 14 Sts. S.W., Wash., D. C., electric distr. sys., from Blumenthal Kahn Electric Co., 13 W. Franklin St., Baltimore. **$102,000.**

†Massachusetts—SITE IMPROVEMENTS—Pub. Housing Auth. NHA, 24 School St., Boston, May 1, site imprvs., from C. B. Lindholm Constr. Co., 1777 East St., Pittsfield, **$132,000.** CD 4/23.

†New Hampshire—IMPROVEMENTS—U. S. Eng., Park Square Bldg., Boston, Mass., Apr. 28, imprvs., Inv. 175-42-121, Sect. A, from Manchester Sand & Gravel Co., Inc., 839 Elm St., Manchester, **$222,284;** Sect. B, from John McCourt Co., 910 Huntington Ave., Boston, **$143,485.** Est. $379,000. Bids 4/29. CD 4/22—ENR 3/12.

†New York — ELECTRIC DISTRIBUTION SYSTEM—U. S. Eng., Chimes Bldg., Syracuse, Apr. 28, electric distr. sys., from Lines Constr. Co., 1776 Bway., New York, N. Y. **$150,021.**

★ **†Oklahoma** — IMPROVEMENTS — U. S. Eng., Citizens Bank Bldg., Denison, Tex., imprvs., Inv. 257-42-144, from Zant & Green, 3429 Dorothy Lane, Fort Worth, Tex., approx. **$479,000.** Est. $600,000.

†Oregon—IMPROVEMENTS—U. S. Eng., Pittock Blk., Portland, Apr. 29, imprvs., water drainage sys., from Jones & King, Hayward, over **$400,000.** CD 4/22—ENR 2/5.

†Oregon—RAILROADS, etc.—U. S. Eng., Pittock Blk., Portland, Apr. 27, railroads, highways, Inv. 698-42-658, from J. A. Terreling & Son Robert Noble Bldg., Boise, Idaho. **$244,311.**

Ore., Ontario — AIRPORT — Airport, from Chester T. Lackey, Ontario, **$69,673.**

†Ore., Pendleton—ELECTRIC DISTRIBUTION SYSTEM—U. S. Eng., Pittock Blk., Portland, electrical distr. sys., Inv. 698-42-606, from Hagen & McClintic, Myrtle Point.

†Pennsylvania — IMPROVEMENTS — U. S. Eng., 1400 Penn Mutual Bldg., Phila., Apr. 28, improvements, from John Meehan & Son, 90 West St., New York, N. Y. CD 4/23—ENR 4/9.

†Texas—IMPROVEMENTS—U. S. Eng., Federal Bldg., Galveston, Apr. 21, improvements, Inv. 359-42-492, from Brown & Root, 4300 Calhoun St., Houston, approx. **$208,000.** CD 4/7—ENR 4/9.

†Texas—IMPROVEMENTS—U. S. Eng., Fort Sam Houston, Apr. 28, from Anderson & Wait, Mission, natural gas distr. sys., **$22,768;** underground utilities, sewers, approx. **$28,600;** water lines, facilities, approx. **$18,260,** all Inv. 359-42-519; from Allen Electric Co., South Pesa St., San Antonio Street and area light distr. sys., **$27,144.**

†Texas — RAILWAY SPURS — U. S. Eng., Fort Sam Houston, Apr. 25, railway spurs, etc. Inv. W-2161-42-44, from Briggs & Killian, Seguin Rd., San Antonio. **$157,549.** CD 4/17.

†Washington — SITE PREPARATION — Bremerton Housing Auth., Bremerton, Apr. 29, site preparation for 160 unit housing, Proj. Wash. 45111, from Valley Constr. Co., 4354 Henderson St., Seattle, **$222,911.** F. A. Naramoer & Associates, Dexter Horton Bldg., Seattle, archts.

★ **†Washington** — TRANSMISSION LINE CONDUCTOR—Bonneville Power Admin., P. O. Box 3537 Portland, Ore., Apr. 27, conductor and conductor accessories, for Covington-Coulee 230,000 Volt Line 2, Inv. 2721, identical bids, from Phelps Dodge Copper Products Corp., 40 Wall St., General Cable Corp., 420 Lexington Ave., and Anaconda Wire & Cable Co., 25 Bway., all of New York. **$1,741,452.** CD 4/14—ENR 4/16.

CONTRACTS AWARDED

★ **California**—IMPROVEMENTS—U. S. Eng., Wright Bldg., Sacramento, improvements, to G. E. Hall, 1326 30 St., Bakersfield.

★ **†California**—IMPROVEMENTS—Yards & Docks, 18 St. and Constitution Ave. N.W., Wash., D. C., Supplement Agreement 3, imprvs., NOY 4561, to Dinwiddie Constr. Co., 210 Crocker Bldg., San Francisco. **$3,490,000.** Awarded 4/15. Additional to CD 8/22—ENR 8/28, under CA.

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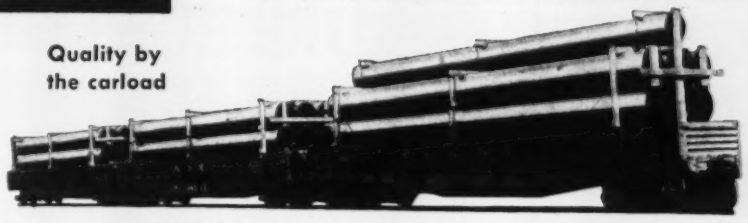

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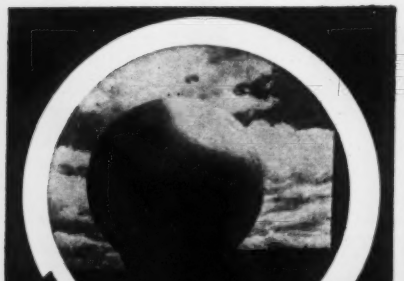

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†California—IMPROVEMENTS—U. S. Eng., 74 New Montgomery St., San Francisco, imprvs., Inv. 868-42-178, to L. C. Smith, 1st and Railroad, San Mateo. Bids 4/30.

★**†California**—IMPROVEMENTS — Yards & Docks, 18 St. and Constitution Ave. N.W., Wash., D. C., Supplemental Agreement 1, addnl. improvements, NOY, to Johnson, Drake & Piper, Inc., 1415 Latham Square Bldg., Oakland. **$2,028,000.** Awarded 4/13. CD 4/4—ENR 4/10.

Calif., Los Angeles—IMPROVEMENTS—Los Angeles Shipbuilding & Dry Dock Co., San Pedro, improvements, own forces. **$213,000.**

†Georgia — IMPROVEMENTS — U. S. Eng., Court House, Mobile, Ala., imprvs., 264 mobilization bldgs., Inv. 569-42-533, to Henderson, Black & Green, Troy, Ala.

†Idaho—ELECTRICAL SERVICE, etc.—U. S. Eng., Pittock Blk., Portland, Ore., electrical service and distr. sys., Inv. 522, to Lessinger Plumbing & Heating Co., 221 S. 10 St., Boise.

†Kansas — IMPROVEMENTS — U. S. Eng., 601 Davidson Bldg., Kansas City, imprvs., roads, parking, water distr. sys., water storage, Contr. 1, to J. J. Connor, City Bank Bldg., Kansas City, Mo.***Contr. 2, to Snyder Johnson, Humbolt, Ia.***Contr. 3, to Koss Constr. Co., 205 Old Colony Bldg., Des Moines, Ia. Est. exceeds **$150,000.** CD 4/17.

★**†Kansas** — IMPROVEMENT — U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., improvements, bldgs., Sect. 4, to S. Patti Constr. Co., Inc., 1114 Bway., Kansas City, Co. Est. over **$1,000,000.** Bids 4/30, awarded 5/2.

★**†Louisiana**—IMPROVEMENTS—U. S. Eng., foot of Prytania St., New Orleans, improvements, to R. P. Farnsworth & Co., 1515 S. Salcedo St., New Orleans. Under **$1,000,000.** CD 4/29, under LB.

★**†Louisiana** — IMPROVEMENTS — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., imprvs., bldgs., Spec. 10900, to R. P. Farnsworth & Co., Inc., 1515 S. Salcedo St., New Orleans, **$976,174.** Awarded 4/21.

†Mississippi—IMPROVEMENTS—U. S. Eng., U. S. Post Office & Court House, Vicksburg, imprvs., facilities, to E. O. Korsmo Constr. Co., Porter Bldg., Memphis, Tenn., over **$100,000.**

†Mississippi—RAILROADS—U. S. Eng., Post Office, Vicksburg, railroads, to Robinson & Young, Baton Rouge, under **$100,000.** Awarded 4/22. CD 4/20—ENR 4/23, under Public Bldgs.

†Montana — IMPROVEMENTS — City, improvements. **WPA.** $77,862. CAA.

†Montana—IMPROVEMENTS—U. S. Eng., Administration Bldg., Fort Peck, improvements, Inv. 45, to Standard Constr. Co., Bozeman.

Nebraska—ELECTRIC DISTRIBUTION SYSTEM—U. S. Eng., 1709 Jackson St., Omaha, electrical distr. sys., to Sandberg & Johnson Co., Hampton, Ia., **$82,452.** Bids 4/27. CD 4/20—ENR 4/23.

Neb., Fremont—AIRPORT—Imprv., exten., airport. **WPA. $175,000.** CD 4/7—ENR 4/9.

†New Jersey—IMPROVEMENTS—U. S. Eng., Customhouse, Phila., Pa., grading, drainage, paving, to Foundations & Excavations, Inc., Moorestown. CD 3/25.

N. J., Camden—PARK IMPROVEMENTS—Camden Co., Park Comn., Court House, imprv. parks, grading, landscaping, draining, paths, etc., **WPA, $51,000.** D. W. Haining, 930 Atlantic Ave., Atlantic City, WPA engr. CD 9/30—ENR 10/2.

N. J., Newark—FREIGHT YARD—Pennsylvania R.R., C. E. Adams, ch. engr., Penn Station, New York, N. Y., 140,000 cu.yd. excav., 145,000 cu.yd. filling, Waverly Yards, to Industrial Utilities Corp., 1139 E. Jersey St., Elizabeth, **$189,850.** CD 3/20.

†New York — IMPROVEMENTS — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash., D. C., improvements, NOY 5506, to Brooklyn-Edison Co., 380 Pearl St. **$392,000.**

★**†New York**—IMPROVEMENTS—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., Supplement Agreement 1, addnl. facilities, NOY 4720, to Walsh Constr. Co., J. Rich Steers, Inc., Cauldwell-Wingate Co. & Raisler Corp., 17 Battery Pl., New York. **$26,860,000.** Awarded 4/20. Additional to CD 4/4/41—ENR 4/10/41, under CA.

★**North Carolina**—IMPROVEMENTS—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., Supplemental Agreement 2, addnl. facilities, NOY 4750, to Goode Constr. Corp., Builders Bldg., Blythe Bros. Co., Inc., 424 S. Brevard St., both Charlotte, and Harrison-Wright Co., Inc., 116 W. 3 St., Charlotte. **$23,946,000.** Additional to CD 4/23/41—ENR 5/1/41, under CA.

†Oregon—UTILITIES, etc.—U. S. Eng., Pittock Blk., Portland, Utilities, Inv. 557, tax Units A and B, to Fred J. Early Co., 369 Pine St., San Francisco, Calif.***Unit C, to Barnham Bros., Salem***electric distr. sys., to James C. Roberts Co., 1424 13 St., Spokane, Wash.

Ore., Eugene — TRACKS, etc. — Southern Pacific Co., W. H. Kirkbride, ch. engr., 65 Market St., San Francisco, Calif., 17,250 ft. tracks, relocating administration forces. **$200,000.**

★**†Pennsylvania** — FACILITIES — Docks, Navy Dpt., 18 St. and Ave. N.W., Wash., D. C., Supplement, 4, facilities, NOY 4100, White & Prentis, Inc., Foley Bros., Merritt-Chapman-Scott Corp., 17 New York, N. Y., **$4,324,976.** CD 35—ENR 3/12, under Virginia sylvania CA.

Pennsylvania — RAILROAD GRADING—Pennsylvania R.R., gins, ch. engr., Broad St. Sta., Ph for 3 mi. railroad spur line from Jct. to Leisenring Mines 2 and 3, Constr. Co., 1 Penn Ave., Pittsburgh —ENR 4/16.

★**†Pennsylvania** — IMPROVEMENTS — American Bridge Co., Ambridge, to John F. Casey Co., Freeport, wall, Pittsburgh. Federally financ

Pennsylvania—IMPROVEMENTS—Sun Shipbuilding Drydock Co., Chester, Raymond R. Rafferty Co., Inc., 150 Phila. Over **$40,000.**

Pa., Norristown—HANGAR, etc.—Penn Airport, C. A. Smolinski, proprietor, N 20-plane hangar and shops, replac tures destroyed by fire, separate **$25,000-$30,000.** CD 4/21—ENR 4/2

★**†South Carolina**—IMPROVEMENTS—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., Supplemental Agreement, 2 addnl. facilities, NOY 4423, to Southeastern Constr. Co., 218 W. 2 St., Charlotte, N. C., **$947,290.**

★**†South Dakota** — SITE GRADING, etc. — U. S. Eng., 1709 Jackson St., Omaha, Neb., grading, leveling site, to Gustafson Bros., 702 S. Summit St., and A. F. Jarvis Constr. Co., 410 Minnehaha Bldg., both Sioux Falls. **$139,548.** Total est. $15,000,000. A-E-M to Perkins & McWayne, 322 Paulton Blk., Sioux Falls, and Stanley Engineering Co., Muscatine, Ia. CD 4/14—ENR 4/16.

★**Tennessee**—IMPROVEMENTS—U. S. Eng., Jackson, improvements, to Wessell Constr. Co., 388 W. Front St., Memphis. Est. **$500,000.**

†Texas—IMPROVEMENT—U. S. Eng., Citizens Bank Bldg., Denison, imprvs., to Gifford-Hill Co., Texas Bank Bldg., Dallas approx. **$176,000.** CAA. CD 4/29.

★**†Texas**—IMPROVEMENTS—U. S. Eng., Federal Bldg., Galveston, addnl. improvements, Inv. 359-42-495, to J. O. Boyd Co., 4956 Cass St., Dallas. **$625,517.** CD 4/24—ENR 4/30, under LB.

†Texas—IMPROVEMENTS—U. S. Eng., Federal Bldg., Galveston, improvements, Inv. 359-42-492 to Brown & Root, 4300 Calhoun St., Houston, **$296,000.**

★**†Texas** — IMPROVEMENTS — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C. Supplemental Agreement 1, imprvs., NOY 5252, to Nathan Wohlfeld Constr. Co., 5027 Willis Ave., Dallas. **$820,000.** Awarded 4/13. Additional to CD 3/27—ENR 4/2, under CA.

Texas—SPUR TRACK—Atchison, Topeka & Santa Fe Ry. System, T. A. Balir, ch. engr. (Western Lines), Amarillo, standard gage railway spur track, near McGregor, owner builds. **$45,000.**

†Texas—RAILROAD TRACKS—U. S. Eng., Federal Bldg., Galveston, railway tracks, turnouts, ballasting, etc., Inv. 359-42-484, to Wm. A. Smith Const. Co., P. O. Box 2553, Houston. **$72,000.** Bids 4/17.

†Tex., Eagle Pass—RAILWAY SPUR TRACK—U. S. Eng., Federal Bldg., Galveston, 4½ mi., standard gage railway spur track, day labor. **$60,000.**

Tex., Houston — SWIMMING POOL — Playland Park, 9200 S. Main St., 95x170 ft., reincon., outdoor swimming pool, force account. **$65,000.** CD 4/28—ENR 4/30.

†Tex., Houston — UNDERGROUND TELEPHONE SYSTEM—U. S. Eng., Federal Bldg., Galveston, underground telephone duct sys., Proj. 359-42-510, to Roy White Electric Co., 905 Chartress St. **$66,000.** Awarded 4/25.

†Utah — MAGNESIUM DEPOSIT DRILLING—Defense Plant Corp., 811 Vermont Ave. N.W., Wash., D. C., drilling magnesium deposits, to Mack Co., Wichita Falls, Tex. **$50,000** per well.

★**†Virginia** — IMPROVEMENTS — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., improvements, NOY 5302, to Stone & Webster Engineering Corp., 90 Broad St., New York, N. Y., **$23,985,000.** Additional to CD 1/27, under CA.

★**†Washington**—IMPROVEMENTS—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., Supplemental Agreement 4, addnl. facilities, NOY 4201, to Austin Co., 16112 Euclid Ave., Cleveland, O., **$3,479,800.** Awarded 4/23. Additional to CD 6/29—ENR 6/26, under CA.

Wash., Seattle—DRYDOCK—Barbee Marine Yard, foot 26 St. N.W., 150 ft. drydock, to A. McLean, 4422 14 St. N.W., Est. **$25,000.** CD 4/2—ENR 4/9.

W. Va., Point Pleasant—IMPROVEMENTS—Marietta Mfg. Co., Point Pleasant, imprvs., to Bellefontaine Development Co., Bellefontaine, O.

UNCLASSIFIED (Contracts Awarded, Cont'd.)

★†U. S. **Possession** — IMPROVEMENTS — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., Supplemental Agreement 4, improvements, NOY 4080, to Frederick Snare Corp., 114 Liberty St., New York, N. Y. **$2,680,000.** Awarded 4/22. Additional to CD 4/24—ENR 4/30, under CA.

★†U. S. **Possession** — IMPROVEMENTS — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., Supplemental Agreement 1, addnl. facilities, NOY 5049, to Pacific Bridge Co., 333 Kearny St., San Francisco, Calif. **$2,543,600.** Awarded 4/14. Additional to 10/15—ENR 10/23, under CA.

B. C., Patricia Bay—AIR RAID SHELTERS—Dpt. Munitions & Supply, Ottawa, Ont., air raid shelters, to General Constr. Co., Ltd., Granville Island, Vancouver. **$38,000.**

LATIN AMERICA

Mexico, Mexico City—S. de T. de I. E., San Juan de Letran, 34, Mexico, D. F., Sindicato de Trabajadores de la Industria Embotelladora (Bottling Industry Workers Union), has arranged with Mexico City Building loan banks to establish 500 model home colony for its workers, $1,125,000; Mexican Govt., Pres. Avila Camacho, approved plans for establishment by Scrita, de Asistencia Publica, Mexico D. F., of a Medical City to house members of medical and allied professions, and their families, public hospitals, laboratories, maternity and nursing homes, etc. $3,000,000.

Mexico, Mexico City—Productira de Artisela, S. A. Mexico City, will construct plant unit for manufacture rayon yarn, etc. San Angel Inn, near here, force account. $500,000.

South America, Brazil—Campanhia Brasileiva de Aluminio, **Sao Paulo,** plans bauxite plant, $2,000,000; Government of Brazil, c/o Hon. Dr. Apolonio Salles, Rio de Janeiro, factory for preparation of products from fish-refrigeration plant, tanks, cranes, etc., **Maranhoo,** $350,000, Ministry of Agriculture, Rio de Janeiro, archt.; Syndicate, c/o Ministry Transport & Public Works, Rio de Janeiro, cement plant, **Cabo Frio,** $500,000; Government of Brazil, c/o on. General Joao de Mendonca Luma, **Rio de Janeiro,** air raid shelters in principal cities along coast, $700,000, Ministry Transport & Public Works, Rio de Janeiro, engrs.

PUBLIC BUILDINGS

PROPOSED WORK

†**Ala., Bynum**—U. S. Eng., warehouse bldgs., Inv. 1455-F, to Skinner-Biederman Co., Tuscaloosa.

†**Ala., Tuskegee**—Macon Co. Bd. Educ., school facilities, Docket Ala. 1-138, $46,000; high school, Docket Ala. 1-136, $61,200. **FWA.**

★†**California**—Housing Auth., City of Los Angeles, 1031 S. Bway., Los Angeles, plans by Wilson, Merrill & Alexander, 714 Olympic Blvd., Los Angeles, 2,000 unit dormitory, for NHA. $1,000,000.

†**California**—U. S. Eng., Post Office Bldg., Sacramento, made plans warehouse bldgs.

†**California**—U. S. Eng., 74 New Montgomery St., San Francisco, completing plans 2 warehouses, box factory, Spec. 868-42-172; refrigerating sys., commissary storehouse, Spec. 868-42-233.

†**California**—U. S. Eng., 74 Montgomery St., San Francisco, made plans post exchange, Inv. 868-42-183.

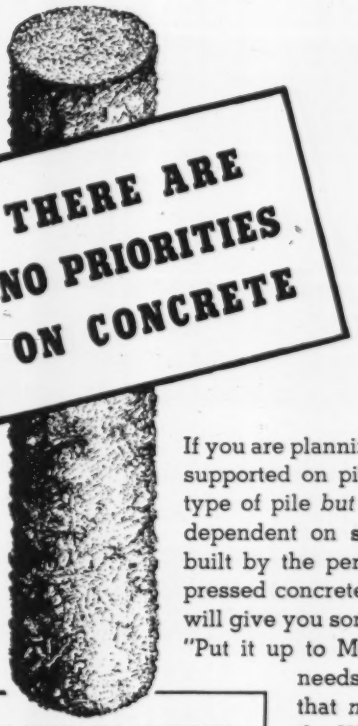
†**California**—U. S. Eng., 74 Montgomery St., San Francisco, made plans warehouse, Inv. 868-42-238.

★†**Connecticut**—Pub. Housing Auth. NHA, 24 School St., Boston, Mass., rejected bids Apr. 11, 200 unit defense housing, Conn. 6123, $900,000. Will readvertise. Golden-Storrs & Co., 343 Fairfield Ave., Hartford, archts. H. B. Van Zelm, 11 Asylum St., Hartford, engr. CD 4/27—ENR 4/30, under LB.

★†**Conn., Bridgeport**—St. Vincent's Hospital, 2820 Main St., W. Stapleton, chn. Advisory Bd., plans by J. G. Phelan, 1336 Fairfield Ave., 5 story, brick, steel wing addn. hospital and 3 story, nurses' home, Docket Conn. 6-134, Main St. $1,115,000. **FWA.** CD 3/24—ENR 3/26.

†**Conn., East Hartford** — Federal Works Agency, F St. between 18 and 19 Sts., Wash., D. C., high school. $103,000. **FWA.**

†**Conn., Groton**—Boro, S. B. Butler, supt., revised plans by Schoifield & Lindsay, 309 State St., New London, 2 story, bsmnt., brick, steel addn. Robert E. Fitch High School, Poquonock Rd., Conn. 6-111. $116,000. **FWA.** H. Van Zelm, 11 Asylum St., Hartford, plumb-



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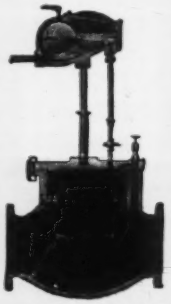

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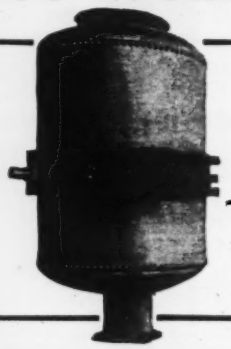

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PUBLIC BLDGS. (Proposed Work, Cont'd.)

ing, elec.-engr. Hopsin & Shapin Co., 231 State St., New London, heating engr. CD 1/6—ENR 1/8.

†**Conn., Milford**—Federal Works Agency, F St. between 18 and 19 Sts., Wash., D. C., school. $269,000. **FWA.**

Conn., New Haven—Bd. Educ., 169 Church St., brick, steel addn. Sheridan Junior High School, Fountain St. $150,000.

Conn., Westville (Sta. New Haven)—Bd. Educ., 169 Church St., New Haven, brick, steel school, Valley St. $150,000.

†**District of Columbia**—Pub. Housing Auth., NHA, Tempo. Bldg. 2, 19 and D Sts. N.W., Wash.,, dormitories, DC-49031.

★†**District of Columbia** — Pub. Housing Auth., NHA, Tempo. Bldg. 2, 19 and D Sts. N.W., 10,000 unit permanent housing.

†**Fla., Crestview**—Federal Works Agency, F St. between 18 and 19 Sts., Wash., D. C., community center. $33,000. **FWA.**

★†**Fla., St. Cloud**—Veterans' Admin., Vermont Ave. between H and I Sts. N.W., Wash., D. C., hospital. $1,750,000.

†**Fla., Sebring**—Federal Works Agency, 22 Marietta St. Bldg., Atlanta, Ga., power plant, Docket Fla. 8-134. $132,710. **FWA.** CD 10/29—ENR 11/6.

★†**Georgia** — Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, 900 unit demountable housing, GA-9043.

†**Ga., Moultrie**—Federal Works Agency, 22 Marietta St. Bldg., Atlanta, plans by W. E. Dunwoody, Jr., Macon, Ga., school, Docket Ga. 9-136. $70,000. **FWA.** CD 3/6—ENR 3/12.

†**Illinois**—U. S. Eng., 222 W. North Bank Dr., Chicago, 7 modified recreation bldgs., dental clinic, 2 ward bldgs., office bldg.

†**Illinois**—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago, Ill., plans by Skidmore, Owings & Merrill, 104 S. Michigan Ave., Chicago, 300 demountable houses.

†**Illinois**—U. S. Eng., 816 U. S. Court House and Customhouse, St. Louis, Mo., bids soon temporary bldgs., etc., 85x85 ft. rein.-con. reservoir and 16x24 ft. pumphouse, warehouses, shops, etc.

Ill., Jacksonville—Light and power plant addn. $200,000.

★†**Ill., Rockford**—Rockford Hospital Assn., Rockford, plans by Hubbard & Hyland, Gas & Electric Bldg., hospital addn., Ill. 11-218. $1,200,000. **FWA.**

★†**Indiana**—Industrial Company, plans nearing completion by Harley & Ellington, Opera House Bldg., Terre Haute, 2 warehouses, for War Dpt. $5,000,000-$6,000,000.

†**Ind., Kingsbury**—J. N. Kneisley, twp. trustee, S. C. Knoll, co. supt., schools, both LaPorte, sketches by J. H. Wildermuth, 527 Bway., Gary, three 1 story, frame demountable type schools. **FWA.**

†**Ind., South Bend**—Epworth Hospital, Bd. Trustees, F. H. Negley, chn., 604 N. Main St., plans completed by Smith, Garden & Erikson, 104 S. Michigan Ave., Chicago, Ill. and bids soon 6 story, 38x96 ft., brick, concrete hospital addn., Docket Ind. 12-127. $185,000. **FWA.** CD 2/13—ENR 2/19.

Ia., Glenwood—State Bd. Control, D. R. McCreery, chn., bldg. construction, State Training School for Girls. $350,000.

†**Ia., Tama** — Iowa Wood Preserving Co., Tama, wood preserving plant. Federally financed.

Ia., Woodward—State Bd. Control, D. R. McCreery, chn., bldg. at State Training School for Boys. $250,000.

★†**Kansas**—U. S. Eng., 1709 Jackson St., Omaha, Neb., bldgs. Over $5,000,000.

†**Kansas**—War Dpt., 20 St. and Constitution Ave. N.W., Wash., D. C., buildings. Over $150,000. Sverdrup & Parcel, Railway Exch. Bldg., St. Louis, Mo., archts.

†**Louisiana**—U. S. Eng., Camp Livingston, P. O. Box 1152, Alexandria, 4 frame bldgs., Job T 1-9, to Robert J. Jones, 318 Main St., Pineville.

†**Maine** — Pub. Housing Auth., NHA, 24 School St., Boston, Mass., 350 unit permanent housing, ME-17035.

†**Me., Kittery**—Federal Works [illegible] and F Sts. N.W., Wash., D. C., [illegible] story, bsmnt., 75x75 ft., brick, [illegible] tion, Me. 17-103. $123,000. **FWA** Beal, Inc., 465 Congress St., Port[illegible] CD 3/3—ENR 3/5.

†**Me., Portland**—Federal Works [illegible] St. between 18 and 19 Sts., junior [illegible] $140,000. **FWA.**

★**Maryland**—U. S. Eng., Standard [illegible] Baltimore, Md., bids soon milit[illegible] housing. Under $1,000,000.

†**Maryland**—Farm Security Ad[illegible] The Mall, between 12 and 14 Sts. S[illegible] D. C., 496 persons dormitory, M[illegible]

†**Michigan** — Pub. Housing A[illegible] NHA, Barlum Tower, Detroit, 5,000 per[illegible] dormitory, MICH-20056 and MICH-20057.

†**Mississippi**—U. S. Eng., U. S. [illegible] Office and Courthouse, Vicksburg, bids [illegible] administration bldgs., utilities.

★†**Missouri** — U. S. Eng., Davidson Bldg., Kansas City, Mo., plans by E. W. Tanner, 310 Ward Parkway, Kansas City, Mo., addn'l bldgs. Over $1,000,000. CD 4/28—ENR 4/30.

†**Mo., Berkeley (St. Louis O. O.)**—Berkeley School Dist. of St. Louis Co., G. A. Pitzinger, pres. Bd. Educ., Caroline Ave., plans by Bonsack & Pearce, Inc., 408 Olive St., St. Louis, brick high school addn. **FWA.**

†**Mo., Kansas City**—War Dpt., 20 St. and Constitution Ave. N.W., Wash., D. C., remodeling warehouse. Over $40,000. Horner & Wyatt, Bd. Trade Bldg., Kansas City, Mo., archts.

†**Mo., Neosho** — Neosho School Dist. [illegible] school addn. $7,100. **FWA.**

†**Mo., St. Charles** — St. Joseph's Hospital, c/o Sisters of St. Mary, Inc., St. Mary's Hospital, 6420 Clayton Rd., Richmond Heights, St. Louis, plans by P. M. O'Meara & Associates, 5709 Waterman Ave., St. Louis, 2 story, brick, concrete hospital addn. $190,000. **FWA.** CD 4/29—ENR 8/21.

†**Nevada**—Pub. Housing Auth., NHA, Humboldt Bank Bldg., 785 Market St., San Francisco, Calif., 25 unit demountable housing, NEV-26031.

†**Nevada**—Pub. Housing Auth., NHA, Humboldt Bank Bldg., 785 Market St., San Francisco, Calif., 75 unit demountable housing, NEV-26041.

†**New Jersey**—Pub. Housing Auth., NHA, 270 Bway., New York, N. Y., 200 unit permanent housing, NJ-28044.

†**N. J., Paterson**—Paterson General Hospital Assn., W. A. Sumner, pres., hospital addns., alterations. $350,000. **FWA.** CD 9/30—ENR 10/2.

★†**New Mexico**—U. S. Eng., Albuquerque, bldgs. $6,500,000.

N. Y., Brooklyn—Dpt. P. Wks., Municipal Bldg., New York, Crown Heights Branch Library. $150,000.

N. Y., Brooklyn—Dpt. P. Wks., Municipal Bldg., New York, Flatbush health center. $375,000.

★**N. Y., Brooklyn**—Bd. Educ., 349 Flatbush Ave., Exten. P. S. 11 vicinity Washington and Greene Aves. $1,604,970.

N. Y., New York—Dpt. P. Wks., Municipal Bldg., new center portion male day room at Home for Dependents, Welfare Island. $165,000.

†**N. Y., Watertown**—House of Good Shepherd, 2 story hospital addn. **FWA.** A. M. Skinner, 228 Arsenal St., archt., retained Shreve, Lamb & Harmon, archts., 11 E. 44 St., New York, N. Y., for architectural services. CD 4/10—ENR 4/16.

†**North Carolina**—Federal Works Agency, Richmond, Va., recreation center. $65,000. **FWA.**

†**North Dakota**—Mineral Development Corp., Dunseith, plant. $250,000.

†**Ohio**—Pub. Housing Auth., NHA, North Interior Bldg., Wash., D. C., 350 unit housing.

†**O., Canton**—Aultmann Hospital Assn., 625 Clarendon Ave., S.W., Canton, hospital addn. $155,000. **FWA.**

†**O., Canton**—Mercy Hospital Assn., 723 Market Ave. N., hospital addn. $155,000. **FWA.**

O., Napoleon—Imprv. light and water plant, new turbine. $187,000.

★†**Oklahoma**—U. S. Eng., 416 Wright Bldg., Tulsa, warehouse facilities expansion. Over $3,000,000.

★†**Oklahoma**—U. S. Eng., 416 Wright Bldg., Tulsa, bldgs. Over $5,000,000.

PUBLIC BLDGS. (Proposed Work, Cont'd.)

★†Okla., **Ardmore**—U. S. Eng., 416 Wright Bldg., Tulsa, buildings. $6,000,000.

Okla., Lawton—Bd. Comrs. Comanche Co., Lawton, hospital addn., Docket Okla. 34-136. $159,000. **FWA.** G. Dale, Koehler Bldg., archt. CD 1/30—ENR 2/5.

†**Oregon**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., bldgs., for U. S. Coast Guard.

★†**Oregon**—**Rustless** Iron & Steel Corp., 3400 E. Chase St., Baltimore, plant, $1,000,000. Defense Plant Corp. will finance. CD 4/29.

†**Ore., Portland**—School Dist. 3, Court House, Portland, plans by Wolff & Phillips, Pearson Fourth Ave. Bldg., 1 story high school addn. and temporary school, Parkrose, near here. $50,000. CD 12/16—ENR 12/18. **FWA.**

†**Pennsylvania**—Pub. Housing Auth., NHA, North Interior Bldg., Wash., D. C., 450 homes, housing development. O. Stonorov & L. L. Kahn, Bulletin Bldg., Phila., archts. CD 10/23—ENR 10/30.

†**Pennsylvania**—Pub. Housing Auth. NHA. & McKeesport Housing Auth., McKeesport, 150 permanent homes.

★†**Pennsylvania**—Pub. Housing Auth., NHA, c/o Allegheny County Housing Auth., 201 County Office Bldg., Pittsburgh, 2,050 permanent homes.

†**Pennsylvania**—Pub. Housing Auth., NHA, 270 Bway., New York, N. Y., 200 unit demountable housing, PA-36023.

†**Pennsylvania** — Pub. Housing Auth., 270 Bway., New York, N. Y., 75 unit permanent housing, PA-36085.

†**Pennsylvania**—Farm Security Admin., The Mall, between 12 and 14 Sts. S.W., Wash., D. C., dormitory, PA-26086.

†**Pennsylvania**—Pub. Housing Auth., NHA, 270 Bway., New York, N. Y., 200 unit demountable housing, PA-36258.

†**Pennsylvania**—Public Housing Auth., NHA, 270 Bway., New York, N. Y., 100 unit permanent housing, PA-36064; 200 unit permanent housing, PA-36265.

†**Pennsylvania**—Pub. Housing Auth., NHA, 270 Bway., New York, N. Y., 300 unit permanent housing, PA-36254.

†**Pennsylvania**—Pub. Housing Auth., NHA, 270 Bway., New York, N. Y., 500 unit permanent housing, PA-36104.

†**Pa., Chester**—Federal Works Agency, F St. between 18 and 19 Sts., Wash., D. C., school. $477,200. **FWA.**

†**Tennessee**—Union City Housing Auth., Union City, plans by Marr & Holman, Stahlman Bldg., Nashville, 40 unit housing, for NHA.

★†**Tennessee**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., bldgs.

★†**Tennessee**—War Dpt., 20 St. and Constitution Ave. N.W., Wash., D. C., military housing. Under $1,000,000.

Tenn., Humboldt — Tennessee Tuberculosis Hospital Comn., Nashville, plans by Everett E. Woods, Sterick Bldg., and Furbinger & Ehrman, U. P. Bank Bldg., both Memphis, 2 hospital unit bldgs. $250,000 state funds allotted.

†**Tenn., Nashville**—U. S. Eng., 306 U. S. Courthouse, Nashville, plans by Marr & Holman, Stahlman Bldg., Nashville, brick, concrete hospital addn., Docket 40-125. $230,000. **FWA.** CD 3/1—ENR 3/26.

Tenn., Oakville — Tennessee Tuberculosis Hospital Comn., Nashville, plans by Furbringer & Ehrman, U. P. Bank Bldg., and Everett Woods, Sterick Bldg., Memphis, 2 bldgs., surgical unit. $250,000.

†**Texas**—Industrial Company, tin can reclaiming and shredding plant. $80,000. Defense Plant Corp. will finance. CD 2/17—ENR 2/19.

†**Texas**—U. S. Eng., Moore Bldg., San Antonio, school.

★†**Texas**—U. S. Eng., Fort Sam Houston, buildings, facilities. $600,000. Phelps & Wees & Simmons, Majestic Bldg., San Antonio, archts.

★†**Texas**—Pub. Housing Auth., NHA, Electric Bldg., 7 and Taylor Sts., Fort Worth, 2,000 unit demountable housing, TEX-41172.

†**Texas**—U. S. Eng., U. S. P. O., Customhouse & Courthouse, Galveston, plans by W. E. Callahan, et al., 2034 Moxley St., Dallas, mfg. plant. Over $300,000.

†**Tex., Gainesville**—State Health Dpt., Austin plans by Shingle & Scott, 918 Littlefield Bldg., Austin, medical clinic and facilities. $40,000.

★†**Tex., Texarkana**—Bd. Educ., H. W. Stillwell, supt. bldgs., impry. existing bldg., Tex. 41-497. $1,384,200. **FWA.** B. Witt, 606

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PUBLIC BLDGS. (Proposed Work, Cont'd)

Texarkana Natl. Bank Bldg., archt. Zumwaldt & Vinther, Thomas Bldg., Dallas, mech. engr. F. W. Chappel, Burt Bldg., Dallas, struct. engr.

†**Virginia**—Farm Security Admin., The Mall, between 12 and 14 Sts. S.W., Wash., D. C., dormitory, VA-44032.

†**Wash., Seattle**—School Dist. 183, Route 7, plans by W. Mallis, Lyon Bldg., school addn., Docket 45-154. $36,000. **FWA.**

†**West Virginia**—Pub. Housing Auth., NHA, Tempo. Bldg. 2, 19 and D Sts. N.W., Wash., D. C., 100 unit demountable housing, W.VA-46023.

★†**West Virginia** — Pub. Housing Auth., NHA, Tempo. Bldg. 2, 19 and D Sts. N.W., Wash., D. C., 700 unit demountable housing, W.VA-46031.

†**Wis., Baraboo**—Baraboo Hospital Assn., Baraboo, plans by L. Siberz, 103 W. Mifflin St., Madison, and bids soon hospital addn., Docket 47-132. $470,946. **FWA.**

★†**Wis., Beloit**—Bd. Educ., Beloit, plans by Law, Law & Potter, 1 S. Pickney St., Madison, and bids soon, high school addn., Docket 47-116. $930,000. **FWA.** CD 10/21—ENR 10/23.

†**Wis., Madison**—St. Mary's Hospital, 720 S. Brooks Ave., Madison, Wis., plans by L. A. Ziberz, 103 W. Mifflin St., Madison, nurses home, Docket 47-136. $393,000. **FWA.**

†**Wis., Sparta**—Dpt. Health & Welfare Serv., 105 W. Adams St., Chicago, Ill., federal recreation bldg., Docket 47-130. $124,700. **FWA.**

†**Wis., Sparta**—Milk Drying Plant, c/o E. Leverich, Sparta, milk drying plant. $350,000. Federally financed.

†**Wis., Union Center**—Milk Drying Plant, c/o G. Carter, Elroy, milk drying plant. $400,000. Federally financed.

★**Canada**—Secretary Dpt. Munitions & Supply, Ottawa, Ont., bids soon, advance battle training center, Western Canada for Dpt. National Defense, Ottawa, Ont. $1,000,000.

★**Man., Winnipeg**—City of Winnipeg Hydro Comn., completion Slave Falls Hydro-Electric plant to provide addnl. 50,000 hp. $1,000,000.

★**Ont., Hamilton**—Wartime Housing Ltd., 55 York St., Toronto, bids soon dormitory 200-300 addnl. dwellings. $450,000-$650,000.

★**Que., Shawinigan Falls**—Wartime Housing Ltd., 55 York St., Toronto, Ont., bids soon addnl. 200-300 houses. $400,000-$600,000.

BIDS ASKED

Bids Asked in May

★†**Alabama** — Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, Ga., 1,200 unit demountable housing, Proj. ALA-1036; 600 unit demountable housing, ALA-1102.

†**Alabama**—Anniston Housing Auth., Anniston, 92 unit permanent housing, Proj. ALA-4-2, for NHA.

†**California** — Pub. Housing Auth., NHA, Humboldt Bank Bldg., 785 Market St., San Francisco, 1,000 unit demountable housing, Proj. CAL-4172. F. H. Reimers, 233 Post St., San Francisco, archt. CD 4/15—ENR 4/23.

†**Connecticut**—New Britain Housing Auth., 300 unit permanent housing, Conn. 6033, for NHA. CD 310—ENR 3/12.

District of Columbia—Alley Dwelling Auth., 302 unit permanent housing, D. C. 1-6, for NHA.

†**Illinois**—Chicago Housing Auth., Chicago, 108 unit permanent housing, ILL-2-6, for NHA.

★†**Indiana**—Pub. Housing Auth., NHA, Interior Bldg., Wash., D. C., 750 units, Ind. 12101. $1,875,000. CD 4/24—ENR 4/30.

†**Indiana**—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago, Ill., 350 unit permanent housing, IND-12093.

†**Maine**—Pub. Housing Auth., NHA, North Interior Bldg., Wash., D. C., 250 unit permanent housing, Me. 17023.

★†**Maryland**—Baltimore Housing Auth., 900 unit permanent housing, Md. 2-9, for NHA.

★†**Michigan** — Detroit Housing Auth., 736 unit permanent housing, MICH-1-8R, for NHA. CD 3/27—ENR 4/2.

★†**New York**—Pub. Housing Auth., NHA, North Interior Bldg., Wash., D. C., 1,050 permanent dwelling units, N. Y. 30037.

†**New York**—Pub. Housing Auth., NHA, North Interior Bldg., Wash., D. C., 300 unit permanent housing, N. Y. 30082. CD 2/11—ENR 2/19.

★†**Oregon**—Pub. Housing Auth., NHA, Humboldt Bank Bldg., 785 Market St., San Francisco, Calif., 300 unit demountable housing ORE-35028, and 200 unit demountable housing ORE-35027. F. M. Stokes, Terminal Sales Bldg., Oregon City, archt. on former, and F. B. Jacobberger, McKay Bldg., Oregon City, archt. latter project. CD 4/22—ENR 4/30.

★†**Oregon**—Pub. Housing Auth., NHA, Humboldt Bank Bldg., 785 Market St., San Francisco, Calif., 300 unit demountable housing ORE-35023, 1,500 unit demountable housing ORE-35024, 500 unit demountable housing ORE-35025, 300 unit demountable housing ORE-35026.

†**Pennsylvania**—Johnstown Housing Auth., 100 unit permanent housing, Pa. 19-2, for NHA. CD 3/9—ENR 3/12.

†**Tennessee**—Paris Housing Auth., Paris, 24 unit permanent housing TENN-8-1, for NHA. CD 4/29.

†**Texas**—Pub. Housing Auth., NHA, Electric Bldg., 6 and Taylor Sts., Fort Worth, 300 unit demountable housing. [illegible] 41134. CD 4/6—ENR 4/9.

†**Vermont**—Pub. Housing Auth., NHA, North Interior Bldg., Wash., D. C., 300 unit demountable housing, Project Vt. 43011.

★†**Washington**—Pub. Housing Auth., NHA, Humboldt Bank Bldg., 785 Market St., San Francisco, Calif., 1,750 unit demountable housing WASH-45049, and 250 unit permanent housing WASH-45141. CD 4/6.

Bids Asked About May 11

†**Maine** — Pub. Housing Auth., NHA, 24 School St., Boston, Mass., 100 unit housing, ME 17033. $450,000. W. O. Armitage, 23 Mitchell Rd., South Portland, archt. CD 4/20—ENR 4/23.

Bids Asked May 11

†**Conn., Groton**—Federal Works Agency, c/o Bd. Educ., school, Pleasant Valley Sect. G. L. Bilderdeck, Groton, archt. $264,000. **FWA.**

†**Pa., Dravosburg**—School Dist., Boro of Dravosburg, at office H. O. Davidson, superv. engr., Post Office, Pittsburgh, school. $120,000. **FWA.** Hunter & Caldwell, 5 Ave. and 36 St., Altoona, archts. CD 4/8—ENR 4/16.

B. C., Sea Island (Postal Dist. Vancouver)—Dpt. Munitions & Supply, Ottawa, Ont., several frame bldgs., concrete fdns., for Dominion Govt., Ottawa, Ont. $150,000. Dpt. Air Defense, Ottawa, Ont., archts.

Bids Asked May 12

†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, plant addns. CD 4/15—ENR 4/23.

Bids Asked About May 12 to 15

★†**Rhode Island**—Providence Housing Auth., 4 Weybosset St., Providence, 24 bldgs. with 278 dwelling units, RI 1-1A, for NHA. $1,270,000. M. Untersee, 4 Weybosset St., Providence, archt. CD 5/1—ENR 4/2.

Bids Asked May 14

★†**Connecticut**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., at 29 Pierce St., Plainville, 200 unit housing, Conn. 6035, $700,000. Extended date. Ebbets & Frid, 15 Lewis St., Hartford, and N. L. Lockwood, 249 Main St., Bristol, assoc. archts. Buck & Buck, 650 Main St., Hartford, engrs. CD 4/20—ENR 4/23.

★†**Massachusetts**—Boston Housing Auth., 18 Oliver St., Boston, 972 unit permanent housing, Mass. 2-10, for NHA. $4,119,750. CD 5/1—ENR 2/12.

★†**Tennessee**—Memphis Housing Auth., 342 unit housing, Lemoyne Gardens Exten., Proj. Tenn. 1-4A, for NHA. Extended date. CD 4/14—ENR 4/16.

Bids Asked About May 15

★†**Maine** — Pub. Housing Auth., NHA, 24 School St., Boston, Mass., 250 permanent and 150 demountable unit housing. $950,000. James H. Ritchie Associates, 20 Newbury St., Boston, Mass., archts. A. Harriman, 88 Shepley St., Auburn, engr. CD 4/20—ENR 4/23.

Bids Asked May 15

†**Alabama**—Huntsville Housing Auth., housing, Project Ala. 10941, for NHA. CD 3/19—ENR 3/26.

†**Alabama**—U. S. Eng., Court House, Mobile, temporary bldgs., Inv. 569-42-614.

★†**Connecticut**—Pub. Housing Auth., NHA, 16 Armistice St., New Britain, 300 unit housing, Conn. 6033. $1,050,000. Extended date. H. F. Ludorf, 410 Asylum St., Hartford, archt. CD 4/20—ENR 4/23.

†**Conn., North Haven** — Federal Works Agency, c/o Town Hall, school, Docket Conn. 6-177. **FWA.** R. H. S. Booth, Old Orchard Rd., archt. CD 4/3—ENR 4/9.

Bids Asked May 16

★†**Connecticut**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., 250 unit demountable housing, CONN 6034. $600,000. Extended date. W. Wilkins, 410 Asiyum St., Hartford, archts. Hubbard, Rickerd & Blakeley, 275 Orange St., New Haven, engrs. CD 4/27—ENR 4/30.

†**Kansas**—War Dpt., 20 St. and Constitution Ave. N.W., Wash., D. C., addnl. bldgs. Howard-Needles, Tammen & Bergendoff, 1012 Baltimore St., Kansas City, Mo., engrs. CD 5/4.

PUBLIC BLDGS. (Bids Asked, Cont'd.)

Wis., Randolph—Bd. Educ. School Dist. 6, 1 and 2 story, part bsmnt., 89x145 ft. school and auditorium, concrete fdn. W. C. Weeks, Inc., 720 Ontario St., Sheboygan, archts.

Bids Asked May 18

Minn., Springfield—A. C. Mueller, city clk., imprv. light and power plant, incl. bldg. addns., alterations, water tube boiler, stoker, etc. Over $40,000. Charles Foster, 316 Medical Arts Bldg., Duluth, engr. CD 2/19—ENR 2/26.

Bids Asked May 19

†**Connecticut**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., 125 unit housing, Conn. 6125. $440,000. C. J. Malmfeldt, archt., and P. D. Bemis, mechanical engr., both 36 Pearl St., Hartford. F. P. Close, 49 Pearl St., Hartford, utilities engr. CD 4/15—ENR 4/23.

†**Wash., Longview**—Pub. Bldgs. Admin., 7 and D Sts. S.W., Wash., D. C., interior painting, etc., post office.

Bids Asked May 20

†**South Carolina**—U. S. Eng., Camp Croft, alterations addns. cold storage plant, CE 2034-42-2808.

Bids Asked May 21

†**N. J., Audubon**—Bd. Educ., Edgewood Ave. and Chestnut St., high school addn., Docket N. J. 28-138. **FWA.** Lange & Perring, 509 Cooper St., Camden, archts.; adv. ENR 5/7. CD 3/18—ENR 3/26.

Bids Asked May 22

★†**Rhode Island**—Providence Housing Auth., 4 Weybosset St., Providence, D. Harry, chn., 119 unit housing RI 1-3, for NHA. $630,000. M. Untersee, 4 Weybosset St., Providence, archt. CD 5/1—ENR 4/2.

†**Virgin Islands, Charlotte Amalie**—Pub. Bldgs. Admin., 7 and D Sts. S.W., Wash., D. C., miscellaneous repairs, exterior and interior painting, post office and customhouse.

Bids Asked May 25

★†**Missouri**—St. Louis Housing Auth., B. B. Craven, exec. dir., Civil Courts Bldg., St. Louis, 30 bldgs. for 300 families, project Mo. 1-3 for NHA. Total est. $3,775,000. Jamieson & Spearl, 1696 Arcade Bldg., St. Louis, archts. CD 4/20—ENR 4/23.

Bids Asked June 9

†**Minn., St. Cloud**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash., D. C., addn. main Bldg. 1, Veterans Admin.

Bids Asked About June 20

†**Wis., Beloit**—City, hospital addn., Docket Wis. 47-123. $195,500 allot. **FWA.** P. W. Swern, 19 S. La Salle St., Chicago, Ill., archt. CD 3/24—ENR 3/26.

Bids Asked

†**Illinois**—W. F. and John Barnes Co., Rockford, 2 story, 58x163 ft. storage bldg. Defense Plant Corp. will finance. Hubbard & Hyland, Gas & Electric Bldg., Rockford, archts.

†**Missouri**—U. S. Eng., Court House, St. Louis, invite contractors to appear in person, for interview and information on large war construction program, incl. buildings, earthwork, grading, railroad constructing water sys., etc., in St. Louis District; adv. ENR 5/7.

★†**Texas**—Sheffield Steep Corp., Gulf Bldg., Houston, mill. $15,000,000 or more. Defense Plant Corp. will finance.

★†**Texas**—Republic Oil & Refining Corp., Texas City, plant, etc. $7,000,000. Defense Plant Corp. will finance. CD 12/29—ENR 1/1.

†**Wisconsin**—Nash Kelvinator Corp., 5626 25 Ave., Kenosha factory, Albert Kahn & Associates, 345 New Center Bldg., Detroit, Mich., archts. and engrs.; factory, Giffels & Vallet, 243 W. Congress St., Detroit, Mich., archts. Defense Plant Corp. will finance.

LOW BIDDERS

†**Ala., Prichard**—Bd. Educ., Apr. 30, school. Docket Ala. 1-178, from E. & E. J. Pfotzer, P.O. Box 129, Mobile. **$307,965.** Bids 4/30. CD 4/16—ENR 4/25.

†**Calif., Redding**—Bureau Reclamation, Customhouse, Denver, Colo., Apr. 22, garage, warehouse, at Coleman Station for migratory-fish control, Kennett Div., Central Valley Proj., near here, Spec. 158*i*-D, from Foster & Dills, 414 13 St., Oakland. **$34,931.** CD 4/9—ENR 4/9.

†**D. C., Wash.**—Pub. Bldgs. Admin., 7 and D Sts. S.W., Apr. 23, altering Freedman's Hospital, 6 and Bryant Sts. N.W., from M. Barash, 2132 Ocean Ave., Brooklyn, N. Y.

★†**Kentucky**—U. S. Eng., P. O. Box 59, Louisville, bldgs., from Sherry-Richards Co., 201 N. Wells St., Chicago, Ill. Est. **$2,000,000.**

★†**Kentucky**—U. S. Eng., 522 Federal Bldg., Cincinnati, O., 1 story, 180x800 ft. bldg., from Gilson-Taylor, Inc., 755 E. 3 St., Lexing-

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PUBLIC BLDGS. (Low Bidders, Cont'd.)

ton. Est. less than **$1,000,000.** Wilson, Bell & Watkins, Hifner Fortune Bldg., Lexington, archts.

†Louisiana—U. S. Eng., Camp Polk, Apr. 15, buildings, Proj. T 1-6, from F. Herbert, Lake Charles. CD 4/8.

†Louisiana—U. S. Eng., U. S. Post Office & Courthouse, Vicksburg, Miss., Apr. 11, utilities, appurtenances, military depot, No. 1106-42-178, from Driver Constr. & Contg. Co., Cotton Exch. Bldg., W. L. Sharpe Contg. Co., Columbian Mutual Trust Bldg., both Memphis, Tenn. CD 4/9—ENR 2/5.

★ **†Maryland**—U. S. Eng., Camp Holabird, bldgs., from Baltimore Contractors, 23 N. Central Ave., Baltimore, Constanza Constr. Co., 1700 E. 29 St., Baltimore, and John K. Ruff Co., 100 W. 22 St., Baltimore. Est. less than **$1,000,000.**

★ **†Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, Apr. 25, 19 bldgs., from Inter-State Const. Co., Ridge Bldg., Collins Contg. Co., Davidson Bldg., and Universal Const. Co., Scarritt Bldg., all Kansas City, Mo. **$1,849,213.**

★ **†Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, Apr. 28, buildings, from Winn-Senter Constr. Co., Railway Exch. Bldg., Kansas City, Mo., under **$1,000,000;** from Jones-Hettelsater Const. Co., Mutual Bldg., Kansas City, Mo., and Sothman Co., Grand Island, under **$1,000,000.**

★ **†Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, Apr. 27, military housing, from C. C. Larsen & Sons Co., 10 N. Main St., Council Bluffs, Ia. **$899,482.** CD 4/20—ENR 4/23.

†Nev., Boulder City—Bureau Reclamation, Boulder City, Apr. 24, 15 duplex cottages, Spec. 1032, from P. S. Webb, Boulder City. **$133,880.** CD 4/1—ENR 4/9.

★ **†Ohio** — Cleveland Metropolitan Housing Auth., E. J. Bohn, secy., West Mall Dr., Cleveland, Apr. 21, 325 dwellings to house 600 units, Brooklyn Acres, Ohio 33075, for NHA, from Schirmer-Peterson Co., 6880 Beaver Ave., Cleveland. **$2,960,637.** CD 4/15—ENR 4/2.

★ **†Ohio** — Cleveland Metropolitan Housing Auth., E. J. Bohn, secy., West Mall Dr., Cleveland, Apr. 18, 350 dwelling unit, Bedford Gardens Housing, Ohio 33073, for NHA, from Schirmer-Peterson Co., 6880 Beaver Ave., Cleveland. **$2,167,676.** P. B. Fleming, Rockefeller Bldg., Cleveland, mech. engr. CD 3/30—ENR 4/2.

†Pennsylvania—U. S. Eng., New Cumberland, storage facilities and utilities, from McCloskey & Co., 1620 W. Thompson St., Phila.

†R. I., North Kingston — Federal Works Agency, 18 and F Sts. N.W., Wash., D. C., Apr. 28, school, No. 37-125, from W. J. Lyons, Norwalk, Conn. **$194,825. FWA.** CD 4/20—ENR 4/23.

†South Carolina—U. S. Eng., Fort Jackson, Mar. 31, buildings, from Claussen-Lawrence Constr. Co., Augusta, Ga.

†South Carolina—U. S. Eng., 33 Custom-house, Charleston, buildings, etc., Inv. 231-42-99, from Simons-Mayrant Co., 16 Broad St., Charleston.

†South Carolina—Charleston Housing Auth., Apr. 29 60 housing units, Project S. C. 38061, for NHA, from Skinner & Ruddock, 155 E. Bay St., Charleston. **$196,864.** Bids 4/14 rejected. H. Tatum, Charleston, archt. CD 4/14—ENR 4/16, under LB.

†S. C., Greenville—Greenville Housing Auth., Greenville, Mountain View Homes SC 4-1, from Potter & Shackelford, In., Greenville, S. C. Base bid **(1) $388,000, (2) $373,500.** CD 3/30—ENR 4/2.

★ **†Tennessee** — Industrial Company, structural steel for plant, from Virginia Bridge Co., 921 Firestone Blvd., Memphis; foundation, from Memphis Construction Co., 575 S. Front St., Memphis. Est. under **$1,000,000.** Federally financed. W. J. Knight Co., Wainwright Bldg., St. Louis, Mo., engrs. CD 4/29.

★ **†Texas**—U. S. Eng., Federal Bldg., Galveston, Apr. 20, 4 power plants, 2 electric distr. sys., 4 water steel storage tanks, 2 water pressure pump. stations, water distr. sys., natural gas distr. station, 2 sanitary sewer plants, sanitary sewer collecting sys., drainage facilities, Project 359-42-479, from Tellepsen Constr. Co., 3900 Clay St., Houston, approx. **$210,000.** Est. $700,000. CD 4/7—ENR 4/9.

★ **†Texas**—U. S. Eng., Citizens Bldg., Fort Worth, Apr. 30, bldgs., from Henger Constr. Co., Dallas Natl. Bank Bldg., Dallas. **$1,317,110.**

★ **†Texas**—U. S. Eng., Moore Bldg., San Antonio, hospital expansion program, Inv. W2161-42-41, from Knutson Const. Co., Union Natl. Bank Bldg., Houston, **$1,213,935.** CD 4/15.

★ **†Texas**—U. S. Eng., Federal Bldg., Galveston, Apr. 20, temporary bldgs., Proj. 359-42-479, from Tellepsen Constr. Co., 3900 Clay St., Houston. Approx. **$960,000.**

★ **†Texas**—U. S. Eng., Fort Sam Houston, Apr. 25, military housing, Inv. W2161-42-35, from V. Miller, Esperson Bldg., Houston. **$774,729.**

★ **†Texas**—U. S. Eng., Citizens Bank Bldg., Denison, bldgs., Areas B and C, from J. Fitch, Construction Bldg., Dallas **$1,328,117,** and **$3,830,720** respectively***spec. temporary housing, from Geo. Dolph Constr. Co., Construction Bldg., and H. A. Dallas **$2,893,400*****military housing, Area A, from R. E. McKee, El Paso, **$1,151,429*****installing underground utilities, sanitary sewer lines, water, natural gas lines, also paving roads, from Sherman & Everett, P. O. Box 306, Houston, **$1,655,319** and **$590,000** respectively ***sewage treatment plant, from J. Bartholomew, Burt Bldg., Dallas, approx. $325,000. CD 4/29—ENR 4/9.

★ **†Texas**—U. S. Eng., Fort Sam Houston, May 1, temporary type bldgs., Project 2, from Christy & Baskett, Builders Exch. Bldg., San Antonio, **$1,051,415.**

†Washington—Farm Security Admin., Portland, Ore., Apr. 29, dormitories, Proj. 412, from Kuney & Johnson, Lloyd Bldg., Seattle, **$238,300.**

★ **†Washington**—King County Housing Auth., County-City Bldg., Seattle, Apr. 29, 300 unit demountable housing for NHA, from Carmichael, Johnson & Sharkey, Hoge Bldg., Seattle, **$1,052,345.** CD 4/23—ENR 4/2.

†Washington—King County Housing Auth., County-City Bldg., Seattle, Apr. 22, 199 permanent housing units, NHA, from Brady Constr. Co., 1166 Mercer St., Seattle, **$425,600.** CD 4/23—ENR 4/30.

†Washington—U. S. Eng., Textile Tower, Seattle, Apr. 4, frame bldg., Inv. 494, from Chisholm & Elford, Bellingham.

†Wisconsin—U. S. Eng., Federal Bldg., Milwaukee, Apr. 28, 24 rest houses, Inv. 1005-42-301, from Couse & Walsh, 521 New York Bldg., St. Paul, Minn. CD 4/24.

CONTRACTS AWARDED

†Alabama—U. S. Eng., Huntsville, bldgs., to Chambers Lumber Co., Athens. CD 4/3—ENR 4/16.

†Alabama—U. S. Eng., Court House, Mobile, bldg., to A. Blair Constr. Co., 1st Natl. Bank Bldg., Montgomery, Ala. Bids 4/20. CD 4/9.

†Alabama—U. S. Eng., P. O. Box 748, Anniston, bldgs., to Skinner-Biederman Co., Tuscaloosa. Bids 4/22.

★ **†Arizona**—U. S. Eng., 751 S. Figueroa St., Los Angeles, housing facilities, to J. S. Sundt & L. M. White, Box 2592, Tucson. Over **$1,000,000.** Awarded 4/29.

†California—Industrial company, office bldg., to R. E. Millsap, 437 Hill St., Los Angeles, over **$150,000.** Federally financed.

★ **†California**—U. S. Eng., 74 New Montgomery St., San Francisco, building, etc., to P. C. Gibson, 372 Velarde St., Mountain View, and to Soule Steel Co., 1750 Army St., San Francisco, both contracts for an amount less than **$1,000,000.**

†California—Industrial comany, office bldg., to R. E. Millsap, 437 S. Hill St., Los Angeles, over **$150,000.** Federally financed.

†California—U. S. Eng., 74 New Montgomery St., San Francisco, storage facilities, Inv. 141, to M.J.B. Constr. Co., 444 E. Market St., Stockton***bldgs., water, gas, sewer, storm and electric sys., Inv. 142, to F. C. Stolte Co., 1405 San Antonio Ave., Alameda***bldg., Inv. 146, to Moore & Roberts, 693 Mission St., San Francisco.

†California—Industrial Company, 220x260 ft. shop, to A. B. Harman, 310 15 St., Santa Monica, **$73,000.** Federally financed. Taylor & Taylor, 803 W. 3 St., Los Angeles, archts. and engrs.

†California—U. S. Eng., 75 New Montgomery St., San Francisco mess hall Inv. 868-42-187, to G. W. Williams Co., 10 California Dr., Burlingame. CD 4/28—ENR 4/30.

★ **†Colorado**—U. S. Eng., 1709 Jackson St., Omaha, Neb., military housing, A-E-M, to Black & Veatch, 4706 Bway., Kansas City, Mo., and Platt Rogers, Inc., P. O. Box 1006, Pueblo. Over **$5,000,000.** CD 4/2—ENR 4/9.

★ **†Connecticut**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., 300 unit housing, Conn. 6101, to Fusco-Amatruda Co., 59 Amity St., New Haven. **$1,141,903.** Bids 4/28. CD 5/1—ENR 3/26.

★ **†Connecticut**—Industrial Company, plant, to Lindholm Constr. Co., Pittsfield, Mass. Est. **$2,000,000-$3,000,000.** Singmaster & Breyer, 420 Lexington Ave., New York, engrs. Defense Plant Corp. will finance. CD 3/3—ENR 3/5.

★ **Connecticut**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., 150 unit defense housing, CONN 6124 to Caulway, Inc., 1841 Bway., New York, N. Y., **$669,300.** Bids 4/14. CD 4/21—ENR 4/23 under LB.

★ **D. C., Wash.**—Alley Dwelling Auth., 1300 E. St. N.W., Barry Farm Housing, Project D. C. 1-9, to Justin C. O'Brien Co., Inc., 234 Lexington Ave., New York, N. Y. **$1,919,000.** CD 4/1—ENR 4/9, under LB.

PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

★†**D. C., Wash.**—Pub. Bldgs. Admin., FWA, 7 and D Sts. S.W., temporary Federal Office Bldg. T-7, to Geo. A. Fuller Co., 311 Independence Ave., S.W. **$3,782,000.** CD 2/24—ENR 2/26.

★†**D. C., Wash.**—Pub. Bldgs. Admin., 7 and D Sts. S.W., temporary Office Bldgs. T3, T4 and T5, to McCloskey & Co., 1620 W. Thompson St., Phila., Pa. **$3,084,000.** CD 2/24—ENR 2/26.

†**Florida**—Wallace Neon Display Co., Orlando, factory addn., for army, own forces.

†**Georgia**—U. S. Eng., 494 Spring St. N.W., Atlanta, buildings, Inv. 2034-42-3100, to M. Sanders, 774 Spring St. N.W., Atlanta.

†**Idaho**—U. S. Eng., Pittock Blk., Portland, bldg., Inv. 598, to J. O. Jordan & Son, 406 S. 6 St., Boise.

†**Illinois**—Giffels & Vallet, archts., 243 W. Congress St., Detroit, Mich., plant addn., to Consolidated Constr. Co., 9 S. Clinton St., Chicago, for Industrial Company. Est. **$200,000.** Federally financed. Bids 4/17. CD 4/15—ENR 4/16.

★†**Illinois**—Defense Plant Corp., 811 Vermont Ave. N.W., Wash., D. C., manufacturing plant to Geo. A. Fuller Co., 111 W. Washington St., Chicago***steel for plant for War Dpt., to Bethlehem Steel Co., 400 N. Michigan St., Chicago***remaining plant bldgs., to 4 V contractors (Gage Structural Steel Co., 3141 Hoyne Ave., Chicago, Duffin Iron Co., 4837 Kedzie St., Chicago, Midland Structural Steel Co., 1300 S. 54 Ave., Cicero, and Clinton Bridge Co., Clinton, Ia.) Total est. **$100,000,000.** CD 3/31—ENR 4/2.

★†**Illinois** — Industrial Company, general contract factory addn., to Thorgersen & Ericksen, 228 N. La Salle St., Chicago. Est. **$1,000,000.** Federally financed. A. Kahn, & Associates, New Centre Bldg., Detroit, Mich., archts.

★†**Illinois**—Industrial Company, mill, to Henry Ericson, 228 N. LaSalle St., Chicago. Est. **$50,000,000** Defense Plant Corp. will finance.

†**Ill., Granite City**—U. S. Eng., 816 U. S. Court House, St. Louis, field office to Bauer Bros. Constr. & Supply Co., 424 Lebanon Ave., Belleville. CD 4/27—ENR 4/30.

Ia., Muscatine—City, Municipal Bd. Water & Light Trustees, H. Zeug, secy., general contract imprv. electric plant, to J. H. Hunzinger & Co., 406 Security Bldg., Davenport, **$48,558.** Bids 4/14. CD 3/23—ENR 3/26.

†**Kansas**—U. S. Eng., 1709 Jackson St., Omaha, Neb., bldg., to Lehr Constr. Co., 2115 Frederick St., St. Joseph, Mo. Est. over **$150,000.** Bids 4/29, awarded 5/1. CD 6/3—ENR 6/5.

†**Kentucky**—U. S. Eng., P. O. Box 59, Louisville, bldgs., Inv. 599-42-240, to Blauner Constr. Co., 189 W. Madison St., Chicago, Ill. **$214,213.** CD 3/16—ENR 3/19.

★†**Kentucky**—U. S. Eng., Federal Bldg., Cincinnati, O. 2nd Div. (1 lot), imprvs., to C. V. Arnett, Berea***Lot 1, 3rd Div. Igloo magazines, shelters, etc., to Lancaster Corp., Standard Oil Bldg., Omaha, Neb.***Lot 1, 3rd Div., to Western Constr. Co., Richmond*** 4th Div. track laying, bridges, to Deckert McDowell, 53 W. Jackson Blvd., Chicago, Ill.***2nd Div., 1 lot to Codell Constr. Co., Winchester, Ky., and to Highland Constr. Co., 644 Baxter St., Louisville. Total est. cost **$25,000,000.** CD 4/24—ENR 4/30, under LB.

★†**Louisiana**—U. S. Eng., foot of Prytania St., New Orleans, construction work, to Perrilliat-Rickey Constr. Co., Inc., S. Rendon and Eve Sts., New Orleans, under **$1,000,000.**

La., New Orleans—2 story medical clinic, Clio St. between St. Charles and Prytania Sts. **WPA. $86,000.**

★†**Maryland**—U. S. Eng., Standard Oil Bldg., Baltimore, buildings, Group 1 A, to Sordoni Constr. Co., Wilkes-Barre, Pa.***for Group 1 B, to Ritter Bros., 1511 N. Cameron St., Harrisburg, Pa.***Group 1 C, to H. B. Alexander & Son, 3 and Vaughn Sts., Harrisburg, Pa.

★†**Maryland**—Industrial Company, plant, to Arthur G. McKee & Co., 30 Rockefeller Plaza, New York, N. Y. Est. **$800,000.** Federally financed.

★†**Maryland**—U. S. Eng., Aberdern Proving Ground, storage, to Green Constr. Co., 110 E. 42 St., New York. Est. less than **$1,000,000.** CD 4/21.

†**Maryland**—U. S. Eng., Standard Oil Bldg., Baltimore, military housing (I-W and 1-DC), to Baltimore Contractors, 23 N. Central Ave., Baltimore.

★†**Maryland**—U. S. Eng., Aberdeen, bldgs., to Chas. C. Sanford Co., 530 N. Fulton Ave., Baltimore. Est. under **$1,000,000.** CD 4/20—ENR 4/23, under LB.

★†**Md., Bethesda**—Public Bldgs. Admin., 7 and D Sts. S.W., Wash., D. C., temporary Office Bldg. T-6, to Bahen & Wright, Inc., 910 Rhode Island Ave. N.E., Wash., D. C. **$567,000.**

†**Mississippi**—U. S. Eng., Court House, Mobile, Ala., 78 bldgs., Inv. 569-42-577, to Henry A. Ivey, Decatur, Ga. CD 4/10—ENR 4/16.

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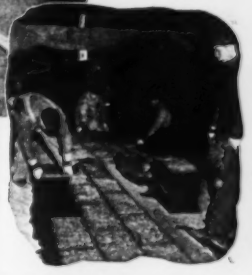

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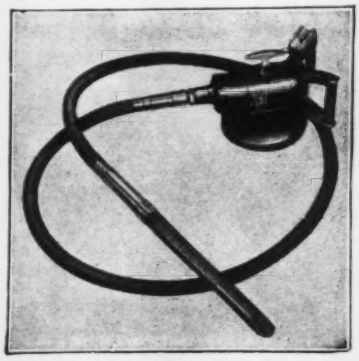

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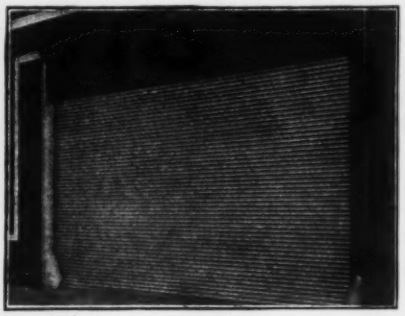

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PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

†**Mississippi**—U. S. Eng., Clarkesdale, school, to Wessel Constr. Co., 388 S. Front St., Memphis, Tenn. W. C. Jones, Sterick Bldg., Memphis, Tenn., archt.

★†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, electrical work for plant, to Commonwealth Electric Co., 417 Bway., St. Paul, Minn. Est. approx. **$500,000.** Additional to CD 4/27—ENR 4/30, under CA.

★†**Nevada**—Industrial Company, plant, to P. J. Walker Co., 660 Market St., San Francisco, Calif., approx. **$16,000,000.** Defense Plant Corp. will finance. CD 4/20—ENR 4/23.

†**New Jersey**—Industrial Company, plant, to Wharton Constr. Co., 228 Washington Ave., Belleville, **$175,000.** Federally financed. I. R. Brown, 111 Floyd St., Belleville, archt. W. A. Kinsey, 207 Market St., Newark, engr.

★†**New Jersey**—Industrial Company, plant addn., to Thompson Starrett Co., Inc., 444 Madison Ave., New York, N. Y. Est. under **$1,000,000.** Defense Plant Corp. will finance. CD 4/1—ENR 4/9.

†**New Jersey**—U. S. Eng., 120 Wall St., New York, N. Y., addnl. facilities, to Winograd & Pluchino, 508 Pavonia Ave., Jersey City.

†**New Jersey**—U. S. Eng., 6 and Walnut St., Phila., Pa., frame bldgs., to A. A. La Fountain, Inc., 161 Beech St., Hackensack. W. A. Goff, 2123 Broad St., Red Bank, archt. and engr.

★†**New Jersey**—U. S. Eng., 120 Wall St., New York, N. Y., improvements, to Charles F. Vachris, Inc., 827 Remsen Ave., Brooklyn, N. Y. Est. over **$1,000,000.** CD 3/2—ENR 3/5.

★†**New Jersey**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., Supplemental Agreement 4, NOY 4676, addnl. facilities, to Wigton Abbott Corp. and Mahony-Troast Constr. Co., 1225 South Ave., Plainfield. **$4,257,000.** Additional to CD 2/27 ENR 3/5, under CA.

†**North Carolina**—U. S. Eng., Durham, bldg., to S. R. Lee, 219 S. West St., Raleigh. Bids 3/9.

★†**North Carolina**—Eastern Carolina Regional Housing Auth., Clinton, 270 brick veneer houses, Proj. NC 21061, to H. L. Coble, Greensboro. **$1,050,000.** Bids 4/16. CD 4/22—ENR 4/30, under LB.

★†**Ohio**—U. S. Eng., 700 Union-Guardian Bldg., Detroit, Mich., buildings, to Ohio State Const. Co., 22 E. Gay St., Columbus. Est. under **$1,000,000.**

★†**Ohio**—Industrial Company, plant, to Rust Engineering Co., Clark Bldg., Pittsburgh, Pa. Est. **$2,500,000.** Defense Plant Corp. will finance.

†**Oklahoma**—Federal Works Agency, 18 and F Sts. N.W., Wash., D. C., c/o D. G. Wright, Vinita, sub-station extens., for Grand River Dam Auth., P.O. Box 672, Vinita, to Elliott Constr. Co., 527 Sunderland Bldg., Omaha, Neb., **$320,495.** Awarded 4/17.

★†**Oklahoma**—U. S. Eng., Citizens Bank Bldg., Denison, Tex. bldgs., natural gas sys., facilities, etc., Project 257-42-151, to Bowers Constr. Co., 627 College St., and J. A. Lundgren & Son, 213 Jackson St., Topeka. **$860,000.** Est. $650,000. CD 4/8—ENR 4/16.

†**Oregon**—U. S. Eng., Pittock Blk., Portland, storage facilities, No. 573, to H. J. Settergren, Couch Bldg., Portland.

†**Oregon**—U. S. Eng., Pittock Blk., Portland, bldg., Inv. 598, to Tri-State Constr. Co., 1812 N.E. 40 St., Portland.

†**Oregon**—U. S. Eng., Pittock Blk., Portland, bldg., Inv. 598, to C. A. Gilmer, Briarwood.

★†**Pennsylvania**—War Dpt., 20 St. and Constitution Ave. N.W., Wash., D. C., Bldgs. S-7, G-32, S-8, G-38, G-81, to Anundsen & Peterson, Sheffield***Bldgs. G-31, to H. Platt Co., 922 Raspberry St., Erie***waterlines, to Dinardo, Inc., 331 Boquet St., Pittsburgh.

★†**South Carolina**—Pittsburgh Metallurgical Co., Inc., Oliver Bldg., Pittsburgh, Pa., plant, own forces. Over **$1,000,000.**

†**South Carolina**—U. S. Eng., Fort Jackson, recreation bldg. for nurses, to W. H. Hand & Son, Belmont.

★†**Tennessee**—U. S. Eng., 307 U. S. Courthouse, Nashville, design and construction plant, to H. K. Ferguson Co., Hanna Bldg., Cleveland. Est. **$25,000,000.**

†**Tennessee**—U. S. Eng., Federal Bldg., Nashville, bldgs., railroads, Divs. 2 and 1, to Oman Constr. Co., Acklen Park, Nashville. **$235,000.**

★†**Tennessee**—U. S. Eng., P. O. Box 97, West Memphis, Ark., bldg. addn., to Wilson, Walters Prater Co., 2144 Lamar Ave., Memphis. Est. **$5,000,000.** Schulz & Norton, Shrine Bldg., Memphis, archts. and engrs.

★†**Tenn., Memphis**—U. S. Eng., P. O. Box 97, Memphis, Tenn., hospital, to Henke Constr. Co., 200 E. Walton St., Chicago, Ill. Less than **$3,000,000.**

†**Texas**—U. S. Eng., Federal Bldg., Galveston, 1,443,600 sq. ft. corrugated sheet steel plates, Inv. 359-42-401, to National Steel Products Co., 1901 Franklin St., Houston. CD 3/3—ENR 3/5, under CA.

†**Texas**—U. S. Eng., Fort Sam Houston, addnl. bldgs., imprvs., Inv. W 2161-32-43, to Investment Service Corp., Tower Petroleum Bldg., Dallas, **$152,583.** Bids 4/22. CD 4/16.

†**Texas**—U. S. Eng., Fort [illegible] Houston, Project 1, bldgs., Inv. W2161-[illegible] to C. H. Oehler, 5007 Bway., Galveston. **$94,543.** Awarded 4/16. CD 4/7.

†**Tex., Wichita Falls**—U. S. [illegible] Bldg., Citizens Bank Bldg., Denison, addnl. bldgs., facilities, Inv. 257-42-164, to Hair, Christian & Mason, Wichita Falls. **$366,000.** CD 4[illegible]—ENR 4/23.

†**Utah**—U. S. Eng., 32 Exchange Pl., Salt Lake City, bldg. addn., to Paul Madison Co., 259 Union Pacific Bldg., Salt Lake City. **$60,000.** Bids 4/16.

†**Va., Norfolk**—At office Div. E. Wks., City Hall, wing and nurses home addn., Norfolk Community Hospital Docket V[illegible] 44-193, W. T. Gregory, Flat Iron Bldg., Norfolk. **$243,990, FWA.** Bids 3/18. CD 3/8—ENR 3/12.

†**Washington**—U. S. Eng., Pittock Blk., Portland, Ore., bldg., Inv. 598, to S. Asp, Vancouver.

†**Washington**—U. S. Eng., Textile Tower, Seattle, relocating bldg., to C. L. Pehling, 6746 19 Ave. N.W., Seattle.

★†**Washington**—U. S. Eng., Textile Tower, Seattle, bldg., to A. G. Hotmin, 172 N. Franklin St., Olympia***bldg., to Gassin Constr. Co., 1163 Ellis St., Bellingham*** bldg., to J. C. Boespflug, Securities Bldg., Seattle***lighting sys., Inv. 869-42-452, to E. F. Pugsley, 6203 Brooklyn St., Seattle. Bids 4 **** bldgs., to Sound Construction & Engineering Co., Northern Life Tower, Seattle***sprinkler sys., to Isbister Heating & Plumbing Co., 364 2 St., Spokane***sprinkler sys., to Globe Automatic Sprinkler Co., 2035 Wash. Ave., Phila., Pa.

†**Washington**—U. S. Eng., Textile Tower, Seattle, building, Inv. 869-42-512, to Anderson Building Co., 408 S. Sheridan St., Spokane. Bids 4/18. CD 4/14.

†**Washington**—U. S. Eng., Textile Tower, Seattle, bldg., Inv. 869-42-487, to Sterr & Hansen, 715 S. 11 St., Tacoma. Bids 4 [illegible] CD 4/1.

†**Washington**—U. S. Eng., Textile Tower, Seattle, shed and fencing, Inv. 869-42-482, to J. F. Graham, 808 N. Ainsworth St., Tacoma. Bids 4/9. CD 4/1.

†**Washington**—U. S. Eng., Textile Tower, Seattle, bldg., Inv. 869-42-492, to A. A. Bengt, S 2710 Scott St., Spokane. Bids 4/11. CD 4/1.

†**Washington**—U. S. Eng., Textile Tower, Seattle, bldg., to Hansen & Weidner, E 3[illegible] 30 St., Spokane. Bids 4/6. CD 4/1.

★†**Washington**—Bureau Reclamation, Custom House, Denver, Colo., 10 transformers for Grand Coulee Power Plant, Columbia Basin Project, Spec. 1025, to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. **$882,610.** Bids 3/3. CD 3/27—ENR 4/2.

★†**Washington**—Renton Housing Auth., Renton, 500 unit permanent housing, Project Wash. 45059, for NHA, to J. C. Boespflug Constr. Co., Securities Bldg., Seattle. **$2,077,000.** Bids 4/25. CD 4/28—ENR 4/30, under LB.

†**West Virginia**—U. S. Eng., Federal Bldg., Huntington, power houses, to Ley Constr. Co., 1255 Main St., Springfield, Mass. Est. under **$1,000,000.** Bids 4/18.

†**Wisconsin**—U. S. Eng., Federal Bldg., Milwaukee, 4 warehouses, to J. H. Findorff & Son, 601 W. Wilson St., Madison; 5 bldgs., to Bentley Constr. Co., 4022 W. Port Washington Rd., Milwaukee.

†**Wisconsin**—Industrial Company, factory addn., to Hutter Constr. Co., 134 Western Ave., Fond du Lac. Defense Plant Corp. will finance. F. J. Stepnoski & Son, 104 S. Main St., Fond du Lac, archts.

COMMERCIAL BUILDINGS

PROPOSED WORK

★**Calif., Los Angeles**—Owner, c/o J. Douglas and Merrill W. Baird, archts., 1041 E. Green St., Pasadena, preliminary plans 171 frame stucco dwellings, San Fernando Valley. $500,000.

Calif., San Diego—Aircraft Workers Club c/o J. Tracy, 1214 4 St., Coronado, will remodel 130 bldgs., to make homes, theatre, etc., 77 acres on Point Loma.

Ind., Indianapolis—Burnet-Binford Lumber Co., 1401 W. 30 St., 117 houses, Bridge Grove Addn. $450,000.

Mich., Pontiac—St. Josephs Mercy Hospital, 900 Woodward Ave., plans by C. J. Sullivan, 2631 Woodward Ave., 5 story, bsmnt., brick, steel, rein.-con. hospital addn. $167,000.

N. J., Garwood—Mountain Ridge Realty Co., 786 Broad St., Newark, preparing plans twenty 2 story, bsmnt., 28x32 ft. frame houses, Myrtle Ave. $160,000.

N. J., Hamilton (mail Bellemead)—Bellemead Development Corp., 535 5 Ave., New York, N. Y., plans by M. L. Grigg, 535 5 Ave., New York, N. Y., two thousand fifty 1, 1½ and 2 story, bsmnt., brick veneer, frame homes. C. J. Kupper, 15 Stelton Rd., New Market, engr.

N. J., Hillside (br. Elizabeth)—Crestmont Homes, 3 Central Ave., Hartsdale, N. Y., plans by G. B. Foster, Scranton Ave., Lynbrook, N. Y., fifty 1½ story, bsmnt. homes. $200,000

COMMERCIAL BLDGS. (Proposed Work, Cont'd.)

★**N. J., Lodi**—Grandview Court Homes, 140 Knickerbocker Rd., Dumont, preparing plans three hundred 1½ story, bsmnt., 24x28 ft. frame homes. $900,000.

★**N. J., South Plainfield**—South Plainfield Development, Inc., c/o L. Kurtz, archt., 15 W. 44 St., New York, N. Y., two hundred fifty 1 story, part bsmnt., frame houses, Hamilton Ave., $1,000,000.

★**O., Cleveland**—Public Adjustment & Constr. Co., A. N. Sill, 402 Park Bldg., one hundred forty-five 1 and 2 family frame houses. $850,000.

O., Euclid (br. Cleveland)—G. Hein, 1021 Dillewood Rd., plans by G. Walters, 1836 Euclid Ave., Cleveland, 50 frame houses. $300,000.

★**O., Marion**—J. J. Burgbacher, Woodsfield, 125 frame dwellings southern section city. $500,000.

O., Medina—Medina Housing Corp., Medina, 60 homes, southwest section. $275,000.

Pa., Beaver Falls — Providence Hospital, V. R. Ray, pres., 803 6 St., New Brighton, sketches by Carlisle & Sharrer, Martin Bldg., Pittsburgh, 3 story, bsmnt., 50x56 ft., brick, tile hospital addn., 3 and 9 Sts.

★**Pa., Phila.**—Suburban Home Construction Co., 4511 N. Broad St., housing development, 5 acre tract, 55 and 56 Sts., Springfield and Warrington Aves. $1,500,000.

Pa., Phila. — Boardman-Smith Corp., 1322 Airdrie St., 69 homes, Passmore, Elbridge and Walker Sts. Over $195,000.

Pa., Reading—Mishal A. Securda, 539 Court St., 30 bungalow type dwellings, College Manor Sect. $150,000.

Tex., Houston (Galena Park Area)—Galena Oaks Co., c/o D. H. Canterbury, 7447 Azalea St., Houston, one hundred five 1 story, asbestos siding dwellings. $325,000.

Wash., Renton—J. R. Dunden, Perry and Holly Sts., Bremerton, 100 houses, Maplewood golf course, near here. $400,000.

Wash., Renton — Washington Veneer Co., foot of Capitol Way, 75 houses, Smithers Field. $250,000.

★**Wash., Vancouver**—L. O. Collins, 2401 F St., plans by D. J. Stewart, 707½ Main St., 160 houses, Telocaset Heights. $500,000. CD 4/16—ENR 4/23.

BIDS ASKED

Wis., Milwaukee—Dwyer-McMicken Co., 1412 S. 72 St., twenty 2 story, 24x30 ft. frame duplex flats.

CONTRACTS AWARDED

Calif., Fullerton—Jewett Bros., 102 W. Malvern St., 39 frame, stucco dwellings, Adams and Ameriye Aves. Owner builds. **$150,000.** C. N. Aldrich, 1834 Dawson Ave., Long Beach, archt.

Calif., Long Beach — W. C. Warrington Constr. Co., 8330 W. 3 St., one hundred twenty-five frame, stucco dwellings, Mayfair Tract. Owner builds. **$400,000.**

Calif., Los Angeles—Aetna Investment Co., 107 N. Larchmont Blvd., fifty-two frame, stucco dwellings, Van Nuys Dist., Burbank Blvd., Hatteras, Collins and Martha Sts., to M. J. Brock & Sons, 107 N. Larchmont Blvd., **$200,000.**

Calif., Richmond—Modern Homes, Inc., 100 S. 16 St., Richmond, 1 story frame dwelling. Owner builds. Over **$150,000.**

Conn., Cos Cob—Chimblo Bros., 12 Harold St., Stamford, 50 frame houses, Cedar Hill Manor, owner builds. **$260,000.** F. S. Massari, 200 Atlantic St., Stamford, archt.

Conn., Darien—Guildway Homes, Inc., 46 Atlantic St., Stamford, 35 housing units, Crest Ave. and Hollow Tree Ridge Rd. Owner builds. **$150,000.**

★**Conn., Manchester** — Manchester Corp., Adams St., one hundred sixty 1 story, 24x26 ft., frame houses, Pines Acres Terrace. Owner builds. **$650,000.** J. E. Kane, 54 Church St., Hartford, archt.

★**Conn., Milford**—Cornelius Clark & Wm. Stowe, 66 Stowe Ave., Wildemere Beach, Milford, 200 frame homes, Pumpkin, Delight and Meadowside Rds., separate contracts. **$900,000.**

Conn., Stamford—W. S. Martin, Chester Rd., Darien, 47 Frame houses, Hamilton and Courtland Aves. Owner builds. **$175,000.**

Conn., West Haven (br. New Haven)—George Fetzer, 18 Shelley Ave., Valhalla, N. Y., 84 frame houses, Jones Hill Rd., separate contracts. **$346,000.** J. S. Thornley, Nyack, N. Y., archt.

Conn., Westport—Westfair Corp., c/o B. V. Brooks, Wilton, 38 homes, Westfair Development, Post Rd., separate contracts. **$155,000.**

Ill., Itasca—Columbia Broadcasting System, 410 N. Michigan Ave., transmitter bldg., to W. J. Barney Corp., W. 50 and S. 41 Summit, Chicago. Est. **$250,000** incl. equip.

Ia., Sioux City—St. Joseph's Mercy Hospital, Dr. E. E. Morgan, staff pres., 2101 Court St., 5 story hospital addn., to Walter Butler Co., Inc., 1300 Minn Bldg., St. Paul, Minn. G. Hilgers, 514 Warneck Bldg., archt.

Mo., North Kansas City—North Park, Co., c/o H. B. Patt, North Kansas City, Mo., 43 duplexes, to W. H. Shackelford, S.W. 79 and

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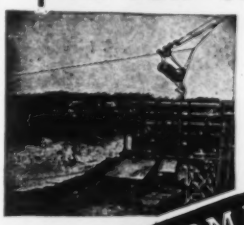

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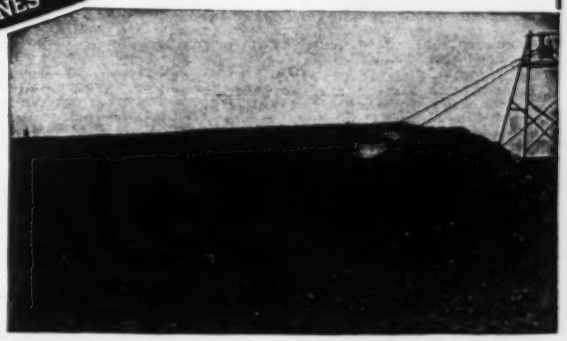

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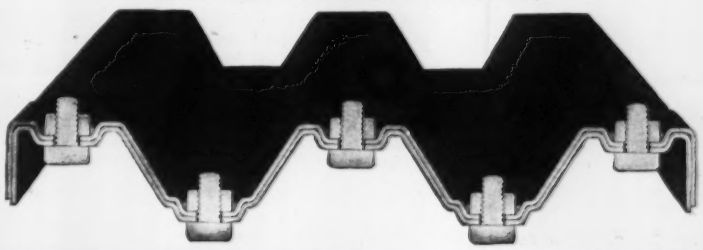

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YOUNGSTOWN OHIO

COMMERCIAL BLDGS. (Contracts Awarded, Cont'd.)

Ward Pkway, Kansas City, Mo. Est. **$172,000.** Sayler & Owen, Law Bldg., Kansas City, Mo., archts.

★ **N. J., Fort Lee**—Fort Lee Colonial Gardens, Inc., B. Neisloss, pres., 33-43 Bell Blvd., Bayside, N. Y., 2 story apartment bldgs., Elsmere Pl., West View Ave., Oleri Terrace and Abbott Blvd. Owner builds. **$3,500,000.** B. Braunstein, 163-18 Jamaica Ave., Jamaica, N. Y., archt.

N. J., Hackensack—Rowland Realty Co., c/o Reliable Home Constr. Co., 144 Lawrence St., Hasbrouck Heights, fifty 2 story, bsmnt., brick veneer, frame houses, Kaplan Ave., separate contracts. **$250,000.** E. J. Maniscalco, Mill Rd., Saddle River, archt.

O., Cleveland—Circuit Realty Co., I. B. Rabb, 10110 Westchester Ave., 25 defense houses, separate contracts. **$150,000.**

★ **O., Cleveland**—Jawa & Carey, c/o M. F. Jawa, 17401 Lorain Ave., 100 frame houses, separate contracts. **$500,000.** J. Krieger, Jr., 13110 Carrington Ave., archt.

★ **Pa., Greentree (mail Carnegie)** — A. L. Wells, 1023 Avacott Dr., Mt. Lebanon, eight 3 story, bsmnt., brick, tile apartment bldgs., Greentree Rd., to H. Justin Brown, 505 Greenhurst Dr., Mt. Lebanon. Est. **$600,000.**

Pa., Leetsdale—S.R.L., Moe I. and Marius A. Rousseau, 523 Martin Bldg., Pittsburgh, ninety-six 1 story, bsmnt., 24x28 ft. frame residences, Old Bethlehem Steel property. Owner builds. **$475,000.**

Pa., Phila.—Baptist Orphanage, 58 St. and Thomas Ave., 2 story infirmary, 58 St. and Thomas Ave., to Frank G. Stewart Co., 1520 Locust St., **$150,000.** J. Roy Carroll, Architects Bldg., archt.

Pa., Phila.—P. J. Stahl, Welsh and Stahl Rds., duplex houses, Hasbrook St., to E. Stahl & Son, Welsh and Stahl Rds. **$150,000.**

Pa., Pittsburgh—E. E. Olsen Co., Clairton Rd., fifty 2 story, bsmnt., 22x27 ft., brick veneer residences, Jefferson Twp., separate contracts. **$300,000.** H. D. Watterson, 709 Renshaw Bldg., archt.

Tex., El Paso—Orndorff-Miller Realty Co., 310 Texas Ave. and C. H. Leavel, 209 Stanton St., thirty-six 1 story, brick, stone dwellings, concrete fdns. Owner builds. Approx. **$200,000.**

Tex., Freeport—Defense Homes Corp., C. H. Van Eman, project engr., Freeport, 100 frame dwellings, to Brown-Lane Constr. Co., 351 S. 4 St., Beaumont, approx. **$300,000.** A. C. Fink, Bankers Mortgage Bldg., Houston, archt.

Tex., Houston (Galena Park Area)—Galena Oak Co., c/o D. H. Canterbury, 7447 Azalea St., Houston, ninety-seven 1 story, asbestos siding dwellings, to Mason Park Lumber & Supply Co., Inc., 7521 Lawndale St., approx. **$300,000.**

Wash., Medina—J. W. and Gregg Wilson, 2854 30 Ave. W., Seattle, 49 houses, day labor. **$200,000.** CD 4/7—ENR 4/9.

Wash., Millwood—Mauser & Mauser, Jamieson Bldg., Spokane, 40 houses, day labor. **$160,000.** CD 4/14—ENR 4/16.

★ **Wash., Vancouver**—Bell & Magnuson, 106 W. 6 St., 100 houses, day labor. **$500,000.** CD 3/17—ENR 3/19.

Wis., Milwaukee—F. Kirkpatrick, Inc., 213 W. State St., forty-five 1 story, 26x28 ft. frame residences. Owner builds. **$225,000.**

INDUSTRIAL BUILDINGS

PROPOSED WORK

★ **Ala., Gorgas**—STEAM PLANT—Alabama Power Co., 600 N. 18 St., Birmingham, soon lets contract, substructure, superstructure steam generator plant, $6,000,000. CD 12/22—ENR 12/25.

★ **Conn., East Hartford (br. Hartford)**—MANUFACTURING UNIT—Union Drawn Steel Div. Republic Steel Corp., Chrysler Bldg., New York, N. Y., mfg. unit, School St. $1,000,000.

★ **Ill., Jacksonville** — PLANT — National Enameling & Stamping Co., Granite City, bids soon plant addn. $1,250,000 incl. equip.

Mass., Athol — PLANT — Charles T. Main, Inc., engrs., 201 Devonshire St., Boston, soon lets contract 1 story, 70x450 ft. timber and asbestos construction plant, Crescent St., for L. S. Starrett Co., 121 Crescent St.

★ **Michigan**—PLANT—Haskelite Corp., 701 Ann St. N.W., preparing plans brick, steel, rein.-con. plant. $2,400,000.

Mich., Ann Arbor—FACTORY—American Broach & Machine Co., Ann Arbor, plans by Douglas D. Loree, Ann Arbor, 1 story, 115x130 ft. brick, steel, concrete factory addn., plain fdn. Approx. $75,000.

Mich., Grand Rapids—PLANT—H. D. Ilgenfritz, archt., 468 Prentis Ave., Detroit, soon lets contract, brick, steel, rein.-con. plant superstructure, for Extruded Metals, Inc., 2710 Book Tower, Detroit.

★ **Minn., Duluth**—SUBSTATION—Minnesota Power & Light Co., 30 W. Superior St., substation, foot W. 50 Ave. $2,700,000.

Minn., Fergus Falls—PLANT—Fergus Falls Co-operative Creamery Assn., Fergus Falls, plans by M. O. Buetow, 1931 University Ave., St. Paul, milk dehydrating plant, $125,000.

★ **Ohio** — FACTORY — Cleveland Pneumatic Aerol Co., subsidiary Cleveland Pneumatic Tool Co., J. Demooy, pres., 3734 E. 78 St., Cleveland, sketches brick, steel factory addns. $3,000,000. McGeorge & Hargett, 9400 Quincy Ave., Cleveland, engrs.

★ **Ohio**—FACTORY—Ohio Crankshaft Co., W. C. Dunn, pres., 3800 Harvard Ave., Cleveland, plans by Wilbur Watson & Associates, 4614 Prospect Ave., Cleveland, brick, steel factory addn. $2,000,000.

★ **Ohio**—PLANT—Otis Steel Co., E. J. Kulas, pres., 3341 Jennings Rd., Cleveland, expanding plant. $16,000,000. R. C. Blackman, c/o owner, engr.

★ **O., Columbus**—FACTORY—Timken Roller Bearing Co., 1025 Cleveland Ave., preparing plans 2 brick, steel factory addns. $600,000. McGeorge & Hargett, 9400 Quincy Ave., Cleveland, engrs.

O., Youngstown—PLANT—Mc Kay Machine Co., A. J. Wardle, pres., Rayen and Foster Sts., bids in about 60 days, large plant addn., Charles St. Over $100,000.

★ **Tennessee**—PLANT—Caine Steel Co., 1820 N. Central St., Chicago, Ill., plant.

★ **Tenn., Memphis** — PLANT — International Harvester Co. Inc., 22 N. Calhoun Ave., farm machinery plant. $5,000,000.

Wis., Kenosha—FACTORY—Snap-on-Tools, Inc., 28 Ave., bids soon addn., also new factory. $40,000 incl. equip. Morton L. Pereira & Associates, 100 W. Monroe St., Chicago, Ill., archts. CD 4/21—ENR 4/23.

Wis., Manitowoc—FACTORY—Eastman Mfg. Co., 1002 N. 11 St., plans by F. W. Raeuber, 926 S. 8 St., 1 story, 40x120 ft. brick, steel factory addn., concrete fdn.

BIDS ASKED

Bids Asked About May 20

N. Y., Bedford—FACTORY—American Cytoscope Maker's, Inc., 1241 Lafayette Ave., New York, J. Kinkel, agt., Poundridge Rd., Bedford, brick factory. $95,000. CD 3/31—ENR 4/2.

Bids Asked About June 20

★ **Ill., Dixon** — POWER PLANT — Illinois Northern Utilities Co., Dixon, bldgs. for power plant addn. $6,000,000. Bids about May 20 for structural steel. Sargent & Lundy, 140 S. Dearborn St., Chicago, Ill., engrs.

Bids Asked

Conn., Danbury — FACTORY — Duro Wear Shirt Co., Inc., 9 Montgomery St. (invited bidders), 3 story, brick, concrete factory addn., Montgomery St. $40,000.

Wis., Green Bay—GARAGE—Jones Transfer Line, Morrow St., 1 story, 75x115 ft. frame garage, concrete fdn. Foeller, Schober, Berners, Safford & Jahn, 310 Pine St., archts.

LOW BIDDERS

O., Columbus—OIL STORAGE, etc.—Curtiss-Wright Corp., 4300 E. 5 Ave., 2 story, 40x102 ft. oil storage and flight office bldg., from Darin & Armstrong, 4300 E. 5 Ave., **$60,071.**

CONTRACTS AWARDED

Calif., Modesto—WAREHOUSE—Tri-Valley Packing Assn., Modesto, 1 and 2 story frame warehouses. Owner builds. **$45,000.** G. N. Hilburn, 1211 K St., archt.

★ **Conn., Bristol**—FACTORY—New Departure Div. General Motors Corp., 269 Main St., brick, steel factory, Franklin St., to George A. Fuller Co., 597 Madison Ave., New York, N. Y. **$600,000.** Albert Kahn, Inc., 345 New Center Bldg., Detroit, Mich., engrs.

Conn., Meriden — FACTORY — Conn. Telephone & Electric Co., Brittania St., 5 story, 20x35 ft. and 30x35 ft., brick, concrete factory addn., Brittania St., to R. Rivolta, 152 Washington Ave., Hamden. Est. **$10,000,** Loenzo Hamilton Associates, 137 Colony St., archts. A. M. Thomas, 29 Whitney St., New Haven, engr.

Conn., Stamford—PLANT—American Cyanamid Co., C. Kennedy, 1937 W. Main St., 1 story, brick, steel plant addn., to Cuzzi Bros. & Singer, Inc., 10 S. 2 Ave., Mt. Vernon, N. Y. Est. **$40,000.**

Ill., Chicago—FACTORY—Crowe Name Plate Mfg. Co., 3701 Ravenswood Ave., 2 story, 107x150 ft. brick, concrete steel top addn., to Robert W. Goldie Co., 19 S. La Salle St. G. W. Klewer, 7631 N. Eastlake Terrace, archt.

Ill., Moline—TRACTOR WORKS—Deere & Co., 1325 3 Ave., general contract tractor works addn., 3 Ave. and 3 St., to Axel Carlson Co., 321 17 St. Est. **$40,000** incl. equip.

Ind., Fort Wayne—FACTORY—Bass Fdry. & Machine Co., 1602 S. Hanna St., steel structure for 1 story, 100x350 ft. factory addn., to Fort Wayne Structural Steel Co., 4920 N. Clinton St. Pohlmyer & Pohlmyer, 262 Central Bldg., archts. CD 4/21—ENR 4/23.

Mass., Brighton — PLANT — Office Hollis French, engrs., 210 South St., Boston, 2 story, 85x130 ft., concrete steel plant, for New England Rendering Co., Abbattoir Grounds, to Scully Constr. Co., 88 1 St., Cambridge. Est. **$65,000.** CD 4/27—ENR 4/30.

Mass., East Springfield—LABORATORY—Westinghouse Electric & Mfg. Co., Construction Dpt., East Springfield, 2 st... bsmnt. 82x284 ft., brick, steel laborat... concrete fdn., to Ernest F. Carlson, In... 584 Main St., Springfield. Approx. $50,000

Mass., Great Barrington — PL... — Great Barrington Mfg. Co., 100 Bridge... 2 story, 50x165 ft. brick, mill constr... plant, Bridge St., separate contracts.

Mass., Southbridge—FACTORY... American Optical Co., 14 Mechanic St., 1 st... bsmnt. 200x720 ft., brick, steel factory... H. P. Cummings Constr. Co., 14 Prospect St., Ware. Est. **$425,000.** CD 4/13—ENR 4/16

Mass., Worcester — FACTORY... Worcester Wire Wks., 70 James St., 1 story... 292 ft. brick factory, James St., to P... Carter Constr. Co., 8 Norwich St., **$55,650**

Mich., Fremont—COLD STORAGE PLANT and WAREHOUSE—Gerber Products Co., Fremont, 1 story, 93x210 ft. and 120x2... ft., brick, concrete cold storage plant and warehouse, plain fdn., to Miller Davis Co., Kalamazoo. Est. approx. **$150,000.** CD 3/10—ENR 3/12.

Minn., St. Paul—PLANT—Ford Motor Co., 966 S. Mississippi River Blvd., general contract altering plant, to Geo. J. Grant Constr. Co., 893 Como Ave., **$50,000.**

N. J., Carteret—BOILER HOUSE—American Oil Co., Roosevelt Ave., altering 2 st... bsmnt. boiler house, Roosevelt Ave., to U. F. Rickard, 566 Irvington Ave., Elizabeth.

N. J., Hillside (br. Elizabeth) — PLANT — Union Carbide & Carbon Co., 30 E. 42 St., New York, N. Y., 1 story, 53x81 ft., brick, steel plant, to Oschwald Constr. Co., 854 Clinton Ave., Newark, **$40,000.**

N. Y., Westfield—PLANT—Arrow Tool & Die Co., Westfield, plant addn., to M. Findlay, Westfield. Est. **$40,000** with equip. CD 4/21—ENR 4/30.

★ **Ohio**—PLANT—Industrial Company, plant to Melbourne Bros. Constr. Co., 2100 Woodland Ave. N.W. Est. under **$1,000,000.**

O., Cleveland—FACTORY—Lucas Machine Tool Co., H. M. Lucas, 523 E. 99 St., 1 story, 75x180 ft. brick timber factory addn., to A. M. Higley Co., 2036 E. 22 St. Est. **$60,000.** Awarded 4/24. CD 4/15—ENR 4/23.

O., Warren—FURNACE—Copperweld Steel Co., Warren, triple-fired billet and bloom heating furnace, to Rust Eng. Co., Clark Bldg., Pittsburgh, Pa. **$190,000.** Awarded 4/22.

Pa., Beaver Falls—FACTORY—Union Drawn Steel Co. Div. Republic Steel Corp., Beaver Falls, factory addn., to Rust Eng. Co., Clark Bldg., Pittsburgh. **$200,000.** Awarded 4/22.

Pa., Pen Argyl — MILL — Buffalo Knitting Mills, Pen Argyl, 1 story, 100x100 ft. textile mill, separate contracts. **$60,000.** CD 4/16—ENR 4/23.

Pa., Phila.—MACHINE SHOP—Selas Co., Erie Ave. and D St., 47x161 ft., steel, concrete block machine shop addn., to Schneider Constr. Co., 3451 N. Park Ave., **$40,000.**

Pa., Reading—TERMINAL and GARAGE—Branch Motor Express Co., 415 Pearl St., terminal and garage, 6 and Bern Sts., to H. T. Horst Constr. Co., 522 Court St., **$150,000.** Muhlenberg, Yerkes & Muhlenberg, Ganster Bldg., archts.

Pa., Sharon—FOUNDRY—National Malleable & Steel Casting Co., W. L. Moody, genl. mgr., 1315 Yahres St., 1 story, 150x350 ft., 40x100 ft. and 80x100 ft. brick, steel foundry addns., to Paul W. Flenn, S. Docket St. Est. **$150,000.**

★ **Wash., Markham**—FACTORY—Cranberry Growers, Inc., c/o C. V. Stater Co., 324 S. W. 9 St., Portland, Ore., canning factory, freezing unit, day labor. **$500,000.** CD 4/2—ENR 4/9.

Wash., Seattle—PLANT—Bethlehem Steel Corp., 4001 28 Ave. S.W., 1 story, steel plant addn., to Isaacson Iron Wks., 2917 E. Marginal Way. Est. **$100,000.**

Wis., Beloit—FOUNDRY and WAREHOUSE Fairbanks Morse & Co., Lawton Ave., foundry addn. and warehouse, to Cunningham Bros., 359 E. Grand Ave., **$45,000.** W. Fred Dolke, 189 W. Madison St., Chicago, Ill., archt.

Wis., Green Bay—FACTORY—Hudson & Sharp Machine Co., 1207 Main St., 1 story, 110x115 ft., brick factory addn., concrete fdn., to J. C. Basten, 618 Roosevelt St. R. W. Surplice, 310 W. Walnut St., archt.

Wis., Oconto—STORAGE—Bond Pickle Co., Oconto, general contract 1 story, 145x215 ft. steel, tile storage bldg., concrete fdn., to E. H. Regal Constr. Co., 136 S. Adams St., Green Bay; steel, to Northeastern Boiler & Welding Co., Green Bay. C. H. Williams, 212½ Pine St., Green Bay, archt.

Wis., Pulaski—FACTORY — Pikle-Rite Co., 3308 W. Armitage Ave., Chicago, Ill., 1 story, part bsmnt., 54x160 ft., concrete block, frame canning factory, concrete fdn., to John Kozik, Pulaski; trusses, to Unit Structures, Inc., Peshitgo. R. W. Surplice, 310 W. Walnut St., Green Bay, archt.

★ **Ont., Sudbury (Falconbridge)** — BLAST FURNACE—Falconbridge Nickel Mines, Ltd., Falconbridge, blast furnace installation, to Canadian Allis-Chalmers, Ltd., 212 King St. W., Toronto, about **$600,000.** CD 8/4—ENR 8/7.

★ **Quebec**—PLANT—Industrial Co., plant, to L. G. Ogilvie & Co., Ltd., 2228 Walkley Ave., Montreal, about **$2,500,000-$3,000,000.** E. T. Pringle & Son, Ltd., 485 McGill St., Montreal, engrs. CD 5/14—**ENR 4/30.**

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Bids: June 3 (932)

Water Works Improvement

COPY OF ADVERTISEMENT
FOR
DIVISION TWO
OF
WATER PURIFICATION PLANT
FOR THE
CITY OF WILMINGTON
NORTH CAROLINA
W.P.W. DOCKET NO. N. C. 31-119

Sealed proposals will be received at the City Hall in Wilminton, N. C., by the Mayor and City Council of the City of Wilmington, N. C., until 10.00 A.M. W.T., June 3rd, 1942, and then publicly opened and read, for Water Works Improvements enumerated as follows:

SECTION 1. Constructing New Water Filtration Plant Building, filters, sedimentation basins and appurtenant structures, furnishing and/or installing pumping units, electrical equipment, laboratory equipment and apparatus, etc., for a designed filter capacity of seven (7) million gallons per day.
SECTION 2. Plumbing in Water Filtration Plant Building.
SECTION 3. Heating in Water Filtration Plant Building.
SECTION 4. All Filter Plant Equipment and appurtenant piping, valves, etc.
SECTION 5. Approximately 1750 linear feet of Chain Link Fence.
SECTION 6. Furnishing and installing complete a 400 K.W. @ .80 P.F. Diesel Engine-Driven Electric Generator.

Proposals must be enclosed in a sealed envelope addressed to the Mayor and City Council of the City of Wilmington, N. C., and on the outside of the envelope must be marked "PROPOSAL FOR WATER-WORKS IMPROVEMENTS, SECTION——" (State Section and/or Item bid on). All proposals must be made upon the blank forms for same provided and included in copies of the Proposal, Specifications and Contract forms. On the outside of the envelope shall be plainly marked the name and address of the bidder.

Each proposal must be accompanied by a certified check drawn on a bank authorized to do business in North Carolina payable to the Mayor and City Council of the City of Wilmington, N. C., in an amount equal to not less than five (5) per cent of the total aggregate amount of the bid or bids, as a guarantee that the contract will be entered into within ten (10) days after notification of award of contract if awarded the bidder and that the required bond will be executed.

A performance bond will be required of the successful bidder in an amount equal to one hundred (100) per cent of the contract, conditioned upon the faithful performance of the contract and upon the payment in full to all persons supplying labor and furnishing materials, equipment and/or apparatus for and in connection with the work to be performed under the contract.

Prescribed wage rates are those set up by the Mayor and City Council of the City of Wilmington, N. C., in accordance with local wage conditions and as set forth in the wage schedule contained in "Instructions to Bidders" included with the Specifications and Contract forms for the project.

General Contractors are notified that "An Act to Regulate the Practice of General Contracting" ratified by the General Assembly of North Carolina on March 10, 1925, and as subsequently amended, will be observed in receiving and awarding general contracts.

Plumbing and heating Contractors are notified that Public Local Laws of 1931, Chapter 52, as amended by Public Laws of 1933, Chapter 57, will be observed in receiving and awarding plumbing and heating contracts.

Electrical contractors are notified that provisions of Chapter 87, Public Laws of 1937, will be observed in receiving bids and awarding contracts for all electrical work installed in the project.

The right is reserved to reject any or all bids and to waive all formalities or to award contract or contracts which, in the opinion of the Mayor and City Council and the Engineer, appear to be for the best interests of the City. The right is also reserved to hold any or all proposals for a period not exceeding thirty (30) days from the date of opening thereof.

Plans and specifications may be obtained upon application to the Engineer accompanied by a certified check deposit in the amount of Twenty (20) Dollars, made payable to the City of Wilmington, N. C. This deposit will be refunded only to those making bona fide direct bids to the City of Wilmington. To those acquiring plans and specifications and who find, upon examining same, that they will not or cannot offer a bid to the City of Wilmington the deposit will be refunded, less the actual cost of reproduction of the drawings and specifications, provided the plans and specifications are returned to the Consulting Engineer in unmarked and otherwise acceptable condition, within thirty (30) days after the date set for receiving bids.

Plans and specifications will also be on file at the office of the City Engineer of Wilmington, in Wilmington, N. C., and at the office of the Associated General Contractors of America, in Charlotte, N. C.

J. R. BENSON,
City Clerk.

WILLIAM C. OLSEN,
Consulting Engineer,
5 Exchange Place,
Raleigh, N. C.

Bids: May 18 (933)

Interceptor Sewer

FOR THE CONSTRUCTION OF THE
GROSSE POINTE SANITARY
INTERCEPTOR
FOR THE
BOARD OF COUNTY ROAD
COMMISSIONERS
OF THE
COUNTY OF WAYNE, MICHIGAN
DOCKET MICH. 20-161

1. The Board of County Road Commissioners of the County of Wayne, Michigan, will receive sealed bids for the construction of the Grosse Pointe Sanitary Interceptor Sewer at its offices at 3800 Barlum Tower, corner of Cadillac Square and Bates Street, Detroit, Michigan, until 11:00 A. M., United States Eastern War Time, Monday, May 18, 1942, at which time and place all bids will be publicly opened and read aloud.

2. The work to be done is the construction of approximately 14,590 lineal feet of 72-inch sewer of brick or monolithic concrete construction, in tunnel, together with reinforced concrete structures, manholes, and necessary appurtenances.

3. All work shall be performed in accordance with the plans and specifications and under the conditions stated in the general conditions, all on file in the office of the Board. Copies of the documents may be obtained by depositing five dollars ($5.00) with the project engineer for each set of documents so obtained. The amount of the deposit for one set of documents will be refunded to each actual bidder who returns the plans and documents in good condition within ten days (10) after the opening of bids.

4. Particular attention is called to the fact that proposals must be based on paying not less than the minimum wage rates as set forth in the wage schedules listed in the proposal.

5. A certified check or bank draft payable without condition to the Board of County Road Commissioners of the County of Wayne, Michigan, or a satisfactory bid bond executed by the bidder and a surety company, in an amount equal to five per cent (5%) of the total amount of the bid shall be submitted with each proposal.

6. The contract documents, including plans and specifications, are on file at the office of the Board of County Road Commissioners of the County of Wayne, Michigan, at 3800 Barlum Tower, Cadillac Square at Bates Street, Detroit, Michigan.

7. The successful bidder will be required to furnish satisfactory performance bond, and labor and material bond, in the sum of the full amount of the contract.

8. No bid may be withdrawn after the scheduled closing time for receipt of bids for at least thirty (30) days thereafter.

9. The Board of County Road Commissioners of the County of Wayne, Michigan, reserves the right to reject any or all bids and to waive any irregularities in bidding, when it is deemed to be for the best interests of the Board and County of Wayne to do so.

BOARD OF COUNTY ROAD COMMISSIONERS OF THE COUNTY OF WAYNE, MICHIGAN
Charles L. Wilson, Chairman
Michael J. O'Brien, Vice-Chairman
John F. Breining, Commissioner
Leroy C. Smith, County Highway Engineer

John E. Hiltz,
Project Engineer.
April 28, 1942.

(U. S. Government)

U. S. ENGINEER OFFICE, CHIMES BUILDING, SYRACUSE, N. Y. Sealed bids will be received here until 11 A.M., E.W.T., May 12, 1942, and then publicly opened for *grading approximately 14,000 feet of airport runways in the vicinity of Avoca, Pa.* Plans and specifications may be obtained by a deposit of $25.00 in the form of cash, CERTIFIED CHECK, or money order payable to "The Disbursing Officer, U. S. Engineer Office, Syracuse, N. Y." (921)

U. S. ENGINEER OFFICE, P. O. Box 59, Louisville, Ky. Sealed bids will be received here until 11:00 a.m. (Central War Time) May 18, 1942, and then opened for Furnishing all labor, plant and material and *manufacturing twenty-five (25) sections of 20 inch I. D. 60 Ft. lengths and twenty-five (25) sections of 24 inch I. D. 60 Ft. lengths electrically welded discharge pipe*, to be delivered f.o.b. U. S. Engineer Depot, Clements and Meyers Sts., Paducah, Ky. No deposit required for plans. Plans and specifications may be seen at U. S. Engineer Office, Louisville, Ky. Further information on application. (936)

(Continued on page 164)

THE MOST FOR THE MONEY — SPEED · EFFICIENCY · ECONOMY
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For Additional Proposal & U. S. Government Advertisements See Pages 164-165

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ILLINOIS
Day & Zimmermann, Inc. *(See Pa.)*
J. H. Manning & Co. *(See N. Y.)*
Sanderson & Porter *(See New York)*

MISSOURI
Howard, Needles, Tammen, Bergendoff *(See N. Y.)*
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SOUTH AMERICA
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See Index at end of cards supplementing these state groupings.

SEARCHLIGHT SECTION

OFFICIAL PROPOSALS

(Continued from page 161)

Bids: May. 21 (931)

High School Addition

DEFENSE PUBLIC WORKS PROJECT
NO. N. J. 28-138

The Board of Education, Audubon, New Jersey, will receive Separate sealed bids for Audubon High School Addition for:
Contract No. 1.—GENERAL CONSTRUCTION
Contract No. 2—HEATING AND VENTILATING
Contract No. 3—PLUMBING
Contract No. 4—ELECTRICAL

Bids will be received by the Board of Education of the Borough of Audubon at the office of said Board, in the Audubon High School Building, Edgewood Avenue and Chestnut Street, Audubon, New Jersey, until Thursday evening, May 21st, 1942, at 8:00 o'clock P. M., Eastern War Time, and that at said office said bids will be publicly opened and read aloud.

The Information for Bidders, Form of Bid, Form of Contract, Plans, Specifications, and Forms of Bid Bond and Performance Bond may be examined at said Office, and the Office of the Architects, Lange & Perring, 509 Cooper Street, Camden, New Jersey, and copies thereof obtained upon payment of $15.00 for each set. Any bidder, upon returning such set promptly and in good condition, will be refunded his payment, and any non-bidder upon so returning such a set will be refunded $10.00.

The Board of Education, Audubon, New Jersey, reserves the right to waive any informalities in or to reject any or all bids.

Each bidder must deposit with his bid security in the amount of 5% of his bid, in the form and subject to the conditions provided in the Information for Bidders.

Attention to bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract.

No bidder may withdraw his bid within 30 days after the actual date of the opening thereof.

GILBERT BAYNE,
District Clerk

May 7, 1942—Date
Of first Advertisement.

(U. S. Government)

THE DISTRICT ENGINEER, 700 Union Guardian Building, Detroit, Michigan today announced that he was asking for bids for furnishing, *erecting and testing two pairs of steel lock gates* in the State of Michigan. The bids will be opened at 11:00 A.M., E.W.T., May 18, 1942, in Detroit, Michigan. (935)

ST LOUIS MISSOURI ENGINEER DISTRICT, 816 U. S. Court House & Custom House, St. Louis, Mo., announces a large *war construction program* within the limits of that District, which program must be completed at the earliest practicable date. The District Engineer has decided that due to the urgency of this work, advertising for lump-sum bids will not be practicable in all cases. Negotiated lump-sum contracts and negotiated unit-price contracts will be considered when the urgency of the work so indicates. The District Engineer is desirous of distributing such contracts equally among competent contractors experienced in the type of work indicated. Contractors who are interested in participating in this program are invited to appear in person at the office of the District Engineer for the purpose of interview and for furnishing specific information relative to their qualifications, organization, and financial status. The District is particularly interested in contractors experienced in building construction, both reinforced and frame, earthwork, grading, paving, railroad construction, water distribution systems, electrical distribution systems, purification plants and sewage disposal plants, well drilling, plumbing, heating, electric wiring, painting, roofing, etc. (934)

For Additional Proposal and U. S. Government Advertisements See Page 165

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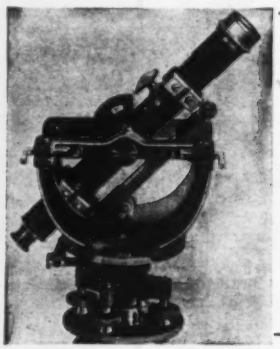

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DAVID WHITE COMPANY 305 W. Court Street Milwaukee, Wisconsin

CONCRETE BOND
Living-Stone bonds new concrete to old—for patching and resurfacing—in use since 1905. Contains no acids. Cost 1c per sq. ft.
Full details on request
LIVING-STONE COMPANY
1804 W. Lanvale St. Baltimore, Md.

A Good Habit . . .

« *This "Where to Buy" Section supplements other advertising in this magazine. . . . It's a good habit to check this page—every issue.*

Reputable contractors more and more realize the importance of a strong conservative surety.
ÆTNA CASUALTY & SURETY COMPANY
Hartford, Conn. CONTRACT BONDS FOR RESPONSIBLE CONTRACTORS Agents Everywhere

OFFICIAL PROPOSALS—(U. S. GOVERNMENT)

THE DISTRICT ENGINEER, 700 Union Guardian Building, Detroit, Michigan, today announced that he was asking for bids for *erecting elevated wood Water Tanks in the State of Ohio.* The bids will be opened at 11:00 A.M., E.W.T., May 13, 1942, in Detroit, Michigan. (937)

THE DISTRICT ENGINEER, 700 Union Guardian Building, Detroit, Michigan, today announced that he was asking for bids for *installing an electric passenger elevator in the State of Michigan.* The bids will be opened at 11:00 A.M., E.W.T., May 15, 1942, in Detroit, Michigan. (938)

THE DISTRICT ENGINEER, 700 Union Guardian Building, Detroit, Michigan, today announced that he was asking for bids for *construction of six hospital group buildings, in the State of Michigan.* The bids will be opened at 2:00 P.M., E.W.T., May 15, 1942, in Detroit, Michigan. (939)

For Busy Sales and Advertising Managers . . .

110 listening posts at your service — reporting to you daily the new construction jobs throughout the United States: *what* they are, *where* they are, *when* they are ready to buy, *who* are the owners, engineers and contractors.

★

● You will find these reports in the *Engineering News-Record* Construction Daily—starred for size, classified by type of work, listed by status—proposed work, bids asked, low bidders, contracts awarded.

You will find them classified geographically for rapid check-up on the day's distribution of new business. You will frequently find them days ahead of other sources of new business news.

You will find that these reports have been checked at reliable sources for you and duplication eliminated. When they reach you, you are ready to go after the day's crop of new business. And this is high priorities, fast moving, building-for-victory business, $8,500,000,000 worth scheduled for 1942.

How You Can Use the
ENR CONSTRUCTION DAILY

★

Sales Managers

for your own birdseye view of the day's market the Daily shows you almost at a glance the largest projects★, the most active territorities, the business to go after first.

Then your staff can clip or copy individual reports, put them on sales report blanks and forward to salesmen or distributors for follow-up and reporting back.

You can send complete Daily service to branch or district offices for their check-up and follow through. (Ask for rates on multiple copy service).

Advertising Managers

You can keep a daily stream of timely promotion going out to engineers and contractors as the Daily reports them coming into the market ready to buy.

***Sign** this order form to start your service immediately*

Engineering News-Record Construction Daily
330 West 42nd St., New York, N. Y.

Please start my ENR Construction Daily Service immediately on terms checked:

1 Month's Subscription ($10 per month) ☐
1 Air Mail " $11 per month) ☐
1 Year's Service (5% discount for cash in advance, $114) ☐

Bill in duplicate ☐ triplicate ☐ at end of 1st month's service.

Address service to: _____

_____

Sign Company Name _____

By _____

Date _____ Address _____

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:

10 cents a word, minimum charge $2.00.

POSITIONS WANTED (full or part-time salaried employment only). ½ the above rates, payable in advance. (See ¶ on box Numbers.)

PROPOSALS, 50 cents a line an insertion.

INFORMATION:

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.

DISCOUNT of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

The advertising rate is 6.90 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. E.N.R.

NEW ADVERTISEMENTS received by May 15th appear in May 21st issue subject to limitations of space available

POSITIONS VACANT

These Positions Vacant advertisements are published subject to agreement by the advertisers not to consider applicants now employed on war work unless they obtain written release from present employer.

MECHANICAL AND REINFORCED CONCRETE Design Engineers on Steel Plant Construction wanted. Location Cleveland. Salary. Give full particulars and salary in first letter. Apply Construction Engineer, American Steel & Wire Co., Rockefeller Bldg., Cleveland, Ohio.

YOUNG ENGINEER WANTED capable estimating and designing plate work. Should have plate shop experience. State salary desired first letter. P-703, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

SEVERAL of this year's graduates in Civil Engineering from recognized schools to enter employ of large structural steel company. All present production on war work. Location in the East. P-704, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

STRUCTURAL STEEL Layout Man wanted, template maker and fitter preferably experience with welded construction. Location Florida. All high rated national defense work. Advise salary required, how soon can report and Draft status. P-705, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

STRUCTURAL STEEL DETAILERS. Have steady employment for experienced detailers and checkers. State fully experience, age and salary expected. J. B. Klein Iron & Foundry Co., P.O. Box 1675, Oklahoma City, Oklahoma.

DESIGNERS AND DRAFTSMEN

We have openings in important DEFENSE PLANT WORK for men having design or drafting experience in one or more of the following:

CONCRETE DESIGNERS AND CHECKERS

Heavy Foundations, Mill Buildings, Rigid Frame Structures, etc.

STRUCTURAL DESIGNERS

Mill Buildings, Bridges, Trestles, Blast Furnaces, Power Plants, Plate Work, etc.

INDUSTRIAL FURNACE DESIGNERS

Open Hearth, Heat Treating and Annealing, Oil Heating, etc.

Working 56 hours three weeks per month and 44 hours one week per month with time and one-half for work in excess of 40 hours per week.

ARTHUR G. McKEE & COMPANY
2300 Chester Avenue
Cleveland, Ohio

WANTED
GENERAL SUPERINTENDENT

For large concrete paving job, one who has recently had complete charge of a similar operation and can secure a portion of his organization.

P-725, Engineering News-Record
330 W. 42nd St., New York City

POSITIONS VACANT

WANTED—EXPERIENCED MAN thoroughly capable handling materials in large Southern shipbuilding yard, title Superintendent Materials and Supplies. Includes disposition all incoming freight, proper storage and final disposition to ships and control of warehouses and interplant traffic. Must be alert, thorough, interested in detail. Experience, education, references, salary first letter. All replies confidential. P-706, Engineering News-Record, 520 N. Michigan Ave., Chicago, Ill.

CONSTRUCTION SUPERINTENDENTS with sliding form experience. Wire if interested The Rust Engineering Company, Pittsburgh, Pennsylvania.

WANTED—Experienced drill steel sharpener on IR sharpener, long job. Wenzel & Henoch Co., c/o Inland Steel Co., Indiana Harbor, Ind.

STRUCTURAL DETAILERS, accurate and fast workers for Mill buildings and Bridges. Steady work with plenty overtime. State experience and rate. Summer Engineering Co., 239-4th Ave., Pittsburgh, Pa.

SALARIED POSITIONS
$2,500 to $25,000

This thoroughly organized advertising service of 32 years' recognized standing and reputation carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been $2,500 or more, send only name and address for details.

R. W. BIXBY, INC.
272 Delward Bldg., Buffalo, N. Y.

NOTICE

The following notice will be published with Positions Vacant advertisements in future issues:

These Positions Vacant advertisements are published subject to agreement by the advertisers not to consider applicants now employed on war work unless they obtain written release from present employer.

Positions Vacant advertisers are asked to indicate their acceptance of this agreement in forwarding copy.

EMPLOYMENT SERVICE

EXECUTIVES AND TECHNICAL MEN. Qualified candidates desiring $2,000 to $20,000 positions may contact employers through our confidential services. Established 27 years. The National Business Bourse, 20 W. Jackson Blvd., Chicago.

POSITIONS WANTED

CONSTRUCTION SUPERINTENDENT—thorough experience on concrete and other construction: Foundations, jetties, sanitary and highway work. Currently located convenient to eastern states employment. PW-672, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

TECHNICAL RESEARCH LIBRARIAN, capable organizing and administration. Abstracting, research, cataloging, etc. 7 years Technical Library experience, 2 years head of a Library. College and Library degrees. Employed, married, deferred. PW-733, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

BUILDING CONSTRUCTION SUPERINTENDENT extensive and thorough experience on heavy concrete and steel construction of all kinds also defense and low cost housing large and medium organizations. PW-711, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

CONSTRUCTION SUPERINTENDENT. Experienced in sewer and all service lines; tunnels and compressed air work. Have been Superintendent on large defense jobs, on general cement finishing. Have all qualified men for experiences mentioned above. PW-732, Engineering News-Record, 520 N. Michigan Ave., Chicago, Ill.

FOUNDATION AND REINFORCED Concrete —Has operated private, general contracting business for 10 years in the construction of private dwellings, Banks, Hospitals, trucking transfer stations and government buildings, sewers, roads and bridges. Graduate Architectural Engineer, age 33; married. Now available and open for responsible position. Frank P. Tosti, 1176 Pelham Parkway, Bronx, N. Y.

RESULTS
when they count most...

FINDING men with specialized skills for war production is a job for the publication. These men read regularly. That's why ENR is so successful NOW, when quick results count most in locating civil, mechanical, electrical and architectural draftsmen, and inspectors on water supply, sewers, roads and building construction, etc. Here's what one Architect-Engineer, who advertised these wants in a recent issue of ENGINEERING NEWS-RECORD says: "This is one advertisement that has produced results."

Departmental Staff
ENGINEERING NEWS-RECORD
330 West 42nd St., New York.

What do YOU need?

SEARCHLIGHT SECTION

A COURSE OF INSTRUCTION BY MAIL IN

STRUCTURAL ENGINEERING

Thirtieth Year

(In the following list, Courses A, B, and C are abbreviated from our complete Structural Engineering course).
A—Public Works Structures.
B—Architectural Engineering.
C—Special Course (State Board Exams, for P.E.)
D—Structural Engineering (complete).
E—Preparatory Course (for non-technical men).

Our Courses are offered principally to

ADULT CIVIL ENGINEERS AND ARCHITECTS

Ninety percent of our engineering students are former graduates (C.E.) from engineering colleges. Our courses have helped thousands of engineers to better positions, increased pay, and success "after forty".

Course B has helped many architects and draftsmen in passing the structural portion of State Board Examinations for license.

Literature sent without expense or obligation. **Write TODAY.**

WILSON ENGINEERING CORPORATION

College House Offices Harvard Square Cambridge, Mass., U. S. A.

POSITIONS WANTED
(Continued from opposite page)

WATER SUPPLY EXECUTIVE Engineer desires permanent position with Public Water Supply or Industry. Seventeen years efficient supervision of engineering, construction, maintenance, operation and industrial problems. Pipe system design, pump specifications, tests, water treatment, waste surveys, flow studies, meter maintenance, office routine, purchasing, etc. PW-756, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

CONSTRUCTION SUPERINTENDENT or foreman, fifteen years experience as Superintendent and general foreman on heavy construction, Dams, Bridges, Highways ,Excavation, Steel erection and general construction, ability to organize and produce, degree in civil engineering, age thirty-three. PW-757, Engineering News-Record, 520 N. Michigan Ave., Chicago, Ill.

MANAGER; construction engineer; or general superintendent; for contractor or architect-engineer, Age 46. Industrial buildings; roads; streets; bridges; 22 years engineering and construction executive experience. Present assignment on one of the largest defense projects complete between May 10th and 16th. Written release furnished. Salary required $7500.00 to $10,000.00. Address PW-759, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

CIVIL ENGINEER; Graduate; 33 years experience; design; construction; Industrial plants; Water supply; Hydro-electric developments. PW-760, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

SUPERINTENDENT 28 years experience Bridges, Harbor work, Dams, Pipe lines, Defense work and all heavy construction. PW-761, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

ENERGETIC SUPERINTENDENT—specializing in wood construction, estimating and design. Expert in pre-fabrication and erection. Thoroughly capable to organize and supervise any building project or cantonment. PW-762, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

CIVIL ENGINEER. Licensed. Completing large job as Chief Field Engineer. Desires similar position. PW-763, Engineering News-Record, 520 N. Michigan Ave., Chicago, Ill.

PART TIME WORK

PART TIME WORK—Licensed Engineer—12 years experience structural steel and concrete designer and detailer. PW-758, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

BUSINESS OPPORTUNITIES

20 ACRES Pittsburgh seam coal 1½ miles from RR. Cover averages 15 feet. Very reasonable. BO-692, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

Chlorine Control Apparatus

WILL SELL outright chlorine control apparatus developments including patents. BO-736, Engineering News-Record, 330 W. 42nd St., New York, N. Y.

PATENT ATTORNEY

PATENTS, TRADE-MARKS, Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 454, 815 10th St., N. W., Washington, D. C.

WORK WANTED

For two Lorain Shovels, Diesel Driven, one and half cubic yard capacity and 3 Bulldozers. Also Dump Trucks.

Will take job as Contractor or on Rental Basis.

Write

A. J. ORLANDO CO.

Washington National Airport Washington, D. C.
Or P.O. Box 1041 Alexandria, Va.

COMPLETE STONE CRUSHING
or
SAND and GRAVEL PROCESSING SERVICE

available on tonnage basis

We will install NEW, MODERN portable or semi-portable plant in any practical location. Capacities 100 to 150 Tons of stone per hour or 150 to 200 Tons of sand and gravel per hour.

ESTIMATES FURNISHED WITHOUT OBLIGATION

Address

Contractors Service Corp.

Box 579, Harrisburg, Pa.

We have to offer some very choice River Front

INDUSTRIAL SITES

subject to prior sale.

One Tract 325' x 600' more or less to low water, 150' river frontage.

A second parcel 325' x 600' more or less to low water.

We are offering both these tracts in the heart of the Metropolitan Industrial Center. Ideal shipping conditions by rail and water and a labor market which is without equal.

Address inquiries Delaware County Trust Company, Chester, Pa. Attention of H. W. Montgomery.

CIVIL and STRUCTURAL ENGINEERING

Questions and solutions to over 200 problems of the last 17 examinations in Structural Planning & Design (Part 1) given to applicants for the P.E. License by N.Y. State Board of Examiners.

Problems in concrete columns, slabs, footings, piles, beams, retaining walls, and anchorage; wood beams and joists; steel beams, channels, columns, bending moment and shear diagrams; riveted joints of many types; plate girders; bridge and roof trusses; strength, processes, and characteristics of materials; and many other types of problems in Civil Engineering.

PRICE $1.50

William Glendinning, B.S., M.S., P.E.
Formerly Instructor at M.I.T.
5123 Bell Blvd. Bayside, N. Y.

For Sale

RAISED DECK CRUISER

40' x 10' x 38" draft. Construction, oak framing, long leaf pine plank. Sleeps 5, galley & toilet, flush deck, for yacht or work boat. Gray 8 cylinder engine. Asking price $1000.00

The Sound Marine & Machine Corp.
700 Rushmore Ave., Mamaroneck, N. Y. Phone 169

FOR RENT

EQUIPMENT FOR RENT!

25 ton stiff leg derricks, 30° or 90°—120 ft. boom.
32 ton Derrick Car.
25 ton Loco. Crane.
1 yard Osgood "Cat." 35 ft. Boom—Back Hoe Attachment.
1 yard McMyler Steam "Cat"—Pile Driver Equipped.
#1 and #6 Vulcan and #5 McK-T. steam hammers.
Frost balls, clam shells, Concrete Pile Bonnets.
36" Gauge 5 ton cap. steel flat push cars.
25 ton to 500 ton jacks.
300 and 400 amp. Gas Engine drive welders.
Gas hoists, air hoists, heavy lifting devices.
100 ton roller nest.
Transit, Builders Y level.

Steel Erectors

Bridges—Buildings—Structural Welding

WILLIAM J. HOWARD, Inc.

35 East Wacker Drive Chicago, Ill.
Phone—Central 6619

FOR RENT

1—5M-K.W. Kohler Lighting Plant.
1—1942 Buffalo Tandem Roller 10 to 12 ton.
2—12 Ton 3 wheel 2 cylinder Buffalo Rollers with scarifier, good condition.
2—5 ton 3 wheel Rollers, good condition.
1—2000 Gal. Water Tank with spray bars mounted on Mack truck.

Tuckahoe Construction Co., Inc.
116 Columbus Ave. Tuckahoe, N. Y.

FOR RENT

1—P & H ⅛ yd. Crawler Crane or Hoe
1—Lorain Shovel 1¼ yd.
1—Lorain Dragline, clamshell or shovel 1¼ yd.
1—Lorain ¾ yd. Crane 30' boom & hoe
1—Lorain ¾ yd. Shovel or trench hoe
1—7 ton Acme Roller
1—Sheepfoot Roller—tandem
1—Gallon Roller 10 ton
1—belt conveyor 24" 37' long
2—6 cu. yd. Scrapers & T 14 tractors
6—International Diesel Bulldozers T 14
1—Lima Crane 90' boom weight 83,800 lbs.
1—TD 6 Bulldozer Diesel
1—RD 7 Bulldozer
2—D8 & 12 yd. Scrapers
1—Bucyrus-Erie Type 10B Shovel & Crane

V. P. Serodino Co.

7 W. 74th St., Cincinnati, Ohio

VAlley 3161

FOR RENT

KOHLER ELECTRIC PLANTS for Emergency Lighting and Power:

20—1500 Watt 110 Volt
3—2000 Watt 110 Volt
2—5000 Watt 110 Volt

HOLTKAMP ELECTRIC SERVICE
Phone 2500 Centralia, Illinois

FOR IMMEDIATE RENTAL

1650 Gal. capacity Asphalt or Tar hauling truck, insulated tank—equipped with dual high power burners, and dial thermometer GMC truck.
Portable Kato 1000 Watt Light plant Wisconsin Motor 110 A. C.

Leicester Contracting Corporation

Wayne, Penna. Wayne 0925-R

SEARCHLIGHT SECTION

USED MACHINERY

Hundreds of Rebuilt AC and DC Motors from 1 to 1000 H. P. Carried in Stock

AIR COMPRESSORS
HOISTS—ELECTRIC AND GASOLINE
ELECTRIC MOTORS—AC AND DC
ELECTRIC GENERATORS
PLATING GENERATORS
TRANSFORMERS
ENGINES—OIL, GAS AND STEAM
CRANES
ARC WELDERS
PUMPS—CENTRIFUGAL AND PLUNGER
GEAR REDUCERS
MACHINE TOOLS

POWER PLANT

Motor Generator Sets
Rotary Converters
Turbo Generator Sets
Engine Generator Sets—AC-DC
Boilers

DUQUESNE ELECTRIC & MFG. CO.
6428 Hamilton Ave. **Pittsburgh, Pa.**

LOCOMOTIVES

1—100 ton American 6 wheel locomotive, 200 lb. pressure.

2—55 ton Lima Shay 8 wheel switching locomotives, coal burners, A.S.M.E., 200 lb. pressure.

2—38 ton American 4 wheel saddle tank locomotives, 148 lb. pressure.

INDUSTRIAL MACHINERY & SUPPLY CO.
217 E. 5th Street **New York, N. Y.**
Tel. Orchard 4-1070

1 Yd 60 A **Lorain Comb. Shovel & Crane**
8" x 36" **Universal Jaw Crusher**
9" x 36" **Cedar Rapids Jaw Crusher**
4' x 8'—3 Deck **Vibrator Screen**
200 HP 2 Dr 2 Speed **Thomas Elec Slackline Cableway Hoist**, Steel Masts & Buckets
79 HP 2 Dr 2 Speed **Sauerman Slackline Cableway Hoist**
10 Ton **Huber** 3 Wheel **Gas Roller**
250 Ton **Blaw-Knox** 3 Comp **Steel Bin**
2—60-Gas **Caterpillar Tractors**
27 E **Foote Pavers**
2—10-12 Yd **Crawler Tractor Wagons**

All Kinds of Equipment,
TELL US WHAT YOU NEED

THE T. J. LANE COMPANY
Box 665 **Springfield, Ohio**
Phone 2-3362

WANTED

NOW AVAILABLE

1—40 yd. **Blaw Knox** (1 yd. batchers) **BIN**
1—25 yd. **Blaw Knox** (½ yd. batchers) **BIN**
1 **PUMPCRETE**, Model 180D with 900' pipe & accessories
1 **K-30 Link Belt Crane**, 50' boom and 30' jib
1—255 **P. & H. CRANE**—with 35' boom and 10' insert

MOCCIA CONSTRUCTION CORP.
550 Union St. **Brooklyn, N. Y.**
Telephone Main 5-3000

WANTED
For Defense Projects!

No Recapture,
Will Purchase or Rent

15—**BULLDOZERS**, 50 H.P. up. Caterpillars preferred but will consider any good make.
6—**CRANES**, with or without clamshell and drag line buckets.
4—**DRAGLINES**, 2-yd. to 5-yd. w. 60' to 100' Booms.
5—**LOCOMOTIVE CRANES**, 15 tons, 25 tons, 40 tons, Sta. Ga.
6—**GRADERS**, Caterpillars, other standard makes.
20—**TRACTORS**, with scrapers. Prefer caterpillar RD8s and D8s with 12-yd. and larger scrapers. Will consider other makes.
6—**TRAILERS AND TRAILER WAGONS.**
10—**TRUCK CRANES**, any make, ⅜ yd. up.
25—**TRUCKS**, Mack and other standard makes, in good condition.

We are interested in the purchase or rental of all the above if available immediately or for early future delivery.
Also interested in **all kinds of excavating and transporting equipment** if in first class condition.
Please furnish complete information including make, model, capacity, serial number, condition, location and prices, either for rental or purchase.

PUBLIC WORKS EQUIPMENT COMPANY, INC.
24-19 Forty-Fifth Street
Astoria, Long Island City, N. Y.
Tel.: Astoria 8-5220

WANTED TO BUY

2½" Standard Black Steel Pipe, New or Second-hand

Advise what you have.

EASTERN PIPE SUPPLY CO.
1424 North 9th St., Philadelphia, Pa.

WAGONS, Bottom Dumps

3 Model TW Allis-Chalmers Speed Aces, 6 cu. yd. Wagons, Hydraulic Operated, in 1st Class working condition, available immediately.

AIR COMPRESSOR RENTAL CO.
1476 E. 118th St. **Cleve., O.**

SHIPYARD WANTS TO BUY

4—Whinley or Gantry Cranes 80 to 125 Ft. Boom.
2—1300 or 1—2600 ft. Air Comp.
20 ton or Heavier Locomotive
3—Locomotive cranes

Owners or Dealers Please Write.

W-720, Engineering News Record
330 W. 42nd St., New York City

FOR SALE

LARGE AUSTIN TRENCHER — digging width 52" x 72", depth 15" to 21"—First-class condition.
40' TOWER—RANSOME PAVER

THOS. M. MADDEN COMPANY
4610 Van Buren St. **Chicago, Ill.**

CRUSHING PLANT

Complete layout available. 30" Superior McCully, 4 ft. Symons Cone, and smaller Crushers; Motors, Transformers, Conveyors, Screens, Shovel, Scale, etc. Capacity 220 TPH. Perfect shape. For sale or lease.

FS-753, Engineering News-Record
520 No. Michigan Ave., Chicago, Ill.

WANTED TO BUY

Small Tractor with Bulldozer

McCABE BROTHERS COMPANY
1203 Boulevard **Bayonne, N. J.**

BULLDOZERS

Two R.D. 7 Bulldozers, both Diesel
One F.D. Cletrac bulldozer, Diesel
One T.D. 40 International Bulldozer, Diesel
All the above equipment is in A-1 condition. Write

Susi Contracting Co. Inc.
100 5th Ave., or **N. Y. C.**
Call our office at Chelsea 2-2999

WANTED

1½ Yd. **Steam shovel** with ASME boiler.
25 to 35 ton **locomotive cranes**, 50 ft. boom.
1½ or 2 Yd. **crawler crane**, 50 ft. boom.
20 to 30 ton **gas or diesel locomotive.** Std. gauge.
10 ton **Buffalo-Spr.**, 3-wh. **gas roller.**
1¼ Yd. **gas crane**, 50 ft. boom.
¾ or 1 Yd. **shovel.** Late model.
½ Yd. **gas combination shovel crane.**
No. 1 and No. 2 **Vulcan Pile-hammers.**
50 to 60 ft. **Portable Conveyor**, 24" belt.
Pullshovel attachment for Model 4 Northwest.

J. T. WALSH
Brisbane Bldg. **Buffalo, N. Y.**

WANTED
Contractor

Shovels, 1 to 2 yards capacity, and **Cranes** from 15 ton upward and equipped with 50 to 60' booms. All equipment to be Diesel or gas powered. Send complete particulars, location for inspection and prices f.o.b. cars.

W-738, Engineering News-Record
330 W. 42nd St., New York City

FOR SALE

1—**Buckeye trencher** C-15 dig up to 42" width x 18' deep. First Class condition.
1—**Bucyrus** (Diesel) D-20 ¾ **Clam** and 1 yd. **dragline digging buckets.**
1—**Insley shovel** and **pull shovel** completely overhauled.
1—**Acme** MM 1½ **stone crusher** first class.

F.S. 645, Engineering News-Record
520 North Michigan Avenue, Chicago, Ill.

WANTED

TRUCK CRANES
LOCOMOTIVE CRANES
10-15-20 tons
SMALL TRACTORS & BULLDOZERS

Eastern Locations

W-755, Engineering News-Record
330 West 42nd St., New York City

FOR SALE

USED RAILROAD EQUIPMENT

4—Locomotives—2-8-0 Type
1—Locomotive—4-6-0 Type
13—Steel hopper cars—100,000 lb. capacity
7—Flat cars—80,000 lb. capacity
5—Gondola cars—80,000 lb. capacity
2—Passenger & baggage cars
1—Passenger car
2—Dump cars
Large quantity railroad ties
Miscellaneous railroad equipment
Specifications furnished on request

RAILROAD STEEL BRIDGES

Excellent Condition

		Weight
Bridge	#1.75—4-15" I beams, 21" span	5,732 lbs.
"	#4.74—Thru plate girder, 37' 6" span	25,280 "
"	#4.79—4 span deck girder, each span 78' 4½"	295,000 "
"	#7.48—1 span deck girder 50'	38,200 "
"	#10.58—3 span thru girder, each span 58'	209,125 "
"	#12.47—2 span thru girder, each span 78'	232,098 "
"	#13.24—1—43' deck girder span; 1—66' deck truss span	100,324 "
"	#13.50—1—26' deck plate girder span	12,019 "
"	#16.64—1—40' thru girder span	20,487 "
"	#18.33—2 span deck plate girder, each span 22'	10,000 "
"	#23.92—1 span 45' deck plate girder	30,600 "
"	#32.92—1 span 36' deck plate girder	16,450 "
"	#36.56—1 span 62' deck plate girder	53,460 "
"	#37.76—1 span 30' 6" deck plate girder	23,235 "
6 small deck plate bridges crossing brooks, from 15' to 19' span, combined weight		44,230 "

OIL STORAGE TANKS

Good Condition

3—5000 Bbl.	1— 600 Bbl.
3—2500 Bbl.	1— 100 Bbl.
1—1000 Bbl.	2—1200 Bbl. Agitators

They can be inspected at Middlesex Refinery Co., Raritan, N. J.

Address your inquiries to

WIRE * *WRITE* * *PHONE*

DULIEN STEEL PRODUCTS, INC.

Room 2280 Woolworth Bldg., New York, N. Y. Tele. COrt. 7-4676

---

3 Ton Hughes & Keegan 4 Wheel 18 ft. Boom Truck Crane.

3—Monighan 3, 5 yd. & 8 yd. Diesel Walker Draglines.

2—27E KOEHRING PAVERS

4 Yd. 120 B Bucyrus Electric Shovel 100 ft. Boom Dragline.

2 Yd. Lima Model 750, 60 ft. Boom Diesel Crane & Dragline.

1½ yd. KOEHRING 601 Shovel Attachment

CRANES

⅜ Yd. P & H 300A, Gas, 30' Boom
1 Yd. NORTHWEST 12 ton Gas 50' Boom
1⅛ Yd. KOEHRING 601 Crane & Shovel
2 Yd. NORTHWEST 28 Ton, Gas, 80' Boom
2 Yd. LINK BELT 30 Ton Gas, 75' Boom
2 BUCYRUS-ERIE, 41-B & 50B Steamers
55B BUCYRUS Diesel 110' Boom
LIMA 35 Ton 801 Diesel 75' Boom
5—25 & 30 Ton Browning Locomotive Cranes
40 Ton Industrial 80 ft. Boom Loco.

TUNNEL EQUIPMENT

2 ROOTS Blowers 24x60, 200-H.P.
7 CONWAY Muckers 20A, 30A, 50A, 60A & 75
2 KOPPLE Jumbo Drill Carriages
110 TUNNEL Cars 1, 2, 4, & 5 yd. cap.
120—Battleship Buckets & Stone Skips
18 Battery Locomotives 3, 5, 6 & 8 ton
5—7½ to 30 KW Battery Charging MG Sets
2 INGERSOLL RAND 54 & 40 Sharpeners

AIR COMPRESSORS

110-315, 420, 603, 1,000 Ft. I-R Diesels
110, 160, 220, 310 & 1300 Gas, Portable
2—676', 870' & 1350' Ingersoll Rand XCB Bltd. 676 ft., 1300 ft., 1572 & 2850 Ing. Rand Elec. Low Pres.: 743, 1200, 1500, 2600 & 5800 ft.

SHOVELS

⅜ Yd. P. & H. 300A—Gas
2—1½ Yd. LIMA 601 Gasoline
2—1⅝ Yd. LIMA Model 750 Diesels
1⅛ Yd. KOEHRING 601 Gas Shovel & Crane
1½ Yd. MARION Model 361—Diesel
2 Yd. BUCYRUS-ERIE 43B Diesel
5 Steam Shovels ⅜ to 4 Yd. Cap.
9 Electric Shovels ⅜ to 12 Yd. Cap.

WHIRLEY CRANES

4—AMERICAN 685 & 1085—100 ft. Booms
2—DAYTON GANTRY 100 ft. Boom, Electric
2—CLYDE WILEY 85 to 100 ft. Booms

CRANE & SHOVEL ATTACHMENTS

½ Yd. P & H 300 Shovel Front
⅞ Yd. NORTHWEST Pull Shovel Front
1¼ Yd. NORTHWEST Gas Shovel Front
1¼-41B Steam Shovel Front

TRUCK CRANES

6 Ton UNIVERSAL Mack on Pneumatic Tires
7½ Ton LORAIN Model 40 on Pneumatics

STEEL DERRICKS

75 Ton Stiff Leg, 135' Boom
5 Ton Steel Stiff Leg 40 Ft. Boom.
2—Clyde 15 Ton Stiff Leg 100 & 125' Boom
2—Terry 25 Ton 100' Boom Guy Steel Erectors
3—7-10 Ton Guy 85' Booms & 50 Ton 100'

PILE HAMMERS & EXTRACTORS

9—McKiernan-Terry No. 1, 3, 5, 6, 7, 9B3, 10B3
Vulcan 800 Extractor & Vulcan #2 & 1 Hammers

PUMPCRETE & GUNITES

Model 160, 190 & 180 & 200 REX Pumpcretes
2—GUNITE N1 Cement Guns & 2—N2

MISCELLANEOUS

1200 ft. 18-20-24 & 36 in. Conveyors
¾ yd. and 1 yd. Owen Clam Shells
3—Bucyrus & Owen Rock Grabs
5x30, 5x50 & 44x25 Cummer Rotary Dryers
1 yd., 2 yd. & 3 yd. Concrete Mixers

LOCOMOTIVES

2—30 Ton PLYMOUTH Std. Ga. Gas.
6—4, 8 & 15 Ton PLYMOUTH Diesel 36 ga.
4—WHITCOMB 5 to 8 Ton 24 Ga. Gasoline
3—WHITCOMB 8 Ton & 14 Ton 36 Ga. Gasoline
2—PLYMOUTH 10 Ton & 20 Ton Std. Ga. Gas.
4—VULCAN 20, 40 & 80 Ton Steam Std. Ga.
7—Storage Battery 3 to 8 ton

DUMP CARS

136 TUNNEL CARS ¾, 1 Yd., 2 Yd. & 4 Yd. Cap.
40—12 Yd., 20 Yd. & 30 Yd. Std. Ga. Air Dump

HOISTING ENGINES

STEAM: 14x12, 9x10, 8¾x10 & 7x10
ELECTRIC: 30, 40, 60, 80, 100, 125 & 150 H.P.
GAS & DIESEL: 15, 40, 75, 90, 110 & 140 H.P.

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ALL STEEL SCOW

175'x45'x8'x9" with American Model 685 Revolver, Steam, Gear Swing, Air Controlled, 95 ft. boom.

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1—10 Ton, 3 wheel Buffalo-Springfield Steam Road Roller with Scarifier, A-1 condition.
1—40 hp. elec. motor & starter
40 steam boat ratchet jacks
75 & 100 ton Joyce hydr. jacks
10-S & 13E concrete mixers

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2—Rex 160 Single Pumpcretes
6" Pipeline & Accessories
1—Williams, 2 Yd. Dragline Bucket

30' 10 x 10 Horse Shoe Tunnel Forms with Traveler

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MISCELLANEOUS EQUIPMENT

CRANES
4—Erie E-2 Steam
MIXERS—Concrete or Mortar
2—Koehring 31-S Electric
3—Kent Mortar Size 3½ Electric
CEMENT GUNS
3—Size N-3

Frazier-Davis Construction Company

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Carmel, New York

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2—TD-18 Tractors with Buc. Erie Bulldozers
10 yard Garwod Scraper. Good shape.
Allis Chalmers 75 LO Tractor with 10 yd. Garwood Scraper.

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Vulcan 20 ton, 36" ga., gas.
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Plymouth 16 ton, 36" ga., Diesel.
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Vulcan 8 ton, 36" ga., Diesel.
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2—Vulcan 36" gauge, 6 tons, gas.
8—3 yd. V type 36" gauge cars.

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Johnson complete Ready-Mix Concrete Plant, 150 yards with mixers.
Erie Bin, 110 tons, 3 compt. with weigh batcher.
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2—Koehring 27E Pavers
Multi-Foote 27E Paver
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ASPHALT PLANT, PORTABLE

Barber-Greene Portable Asphalt Plant.

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Allis Chalmers 10" cent. electric.
8" Barnes cent. gas, 35 HP drive.
8" Goulds cent., gas, 35 HP drive.
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8" Lawrence cent., gas, 35 HP.
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Westco 2 stage, elec. 110 gpm @ 100'.
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SHOVELS & CRANES

Lima 801 Dragline 2½ yds. Hesselman engine.
Osgood Dragline, Diesel, 1¾ yds.
Osgood Conqueror Gas Shovel, 1½ yds.
Osgood Gas Shovel, 1½ yds.
Buc. Erie 50 Steam Shovel, 2 yds.
43B Bucyrus Erie Diesel Shovel, 1¾ yds.
Buc. Erie 20B Air Tunnel Shovel.
Buc. Erie Electric Tunnel Shovel, 1 yd.
Buc. Erie 30 Air Tunnel Shovel.
Link-Belt K1 Crane, gas, 50' bm.
Ind. Brownhoist gas Crane, 40' bm.
Marion Mdl. 125 Elec. Shovel, 3½ yds.
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Northwest #3 Shovel and Crane.
General ⅜ yd. Backhoe, Diesel. New 1940.
Northwest ¾ yd. Electric Shovel.
McMyler 25 ton Steam Crane.

BUCKETS

2½ yd. Hayward Clamshell digging
1¾ yd. Hayward Clamshell rehandling
1—1 yd. Hayward clamshell digging.
Page Class RC 1¾ yd. Dragline.
Bucyrus Erie Type AX 1¼ yd. Dragline.
Haiss 1 yd. Clamshell rehandling.
Haiss ½ yd. Clamshell digging.
Haiss ½ yd. Clamshell rehandling.
Hayward ¾ yd., 4 leaf, Orange Peel.

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Rex Model 200 with piping.
1—Rex Model 190 with 800' pipe.
1—Rex Model 180 with 1,000' pipe.

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B.S. 10 ton 3 wheel, gas, scarifier.
B.S. 10 ton, tandem, gas.

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Lambert electric 3 dr. 150 HP
Lambert electric swinger 40 HP
4—7 x 10 D.D. steam, place for boiler.
Sauerman 2 dr. 150 HP electric drag.
Clyde D.D. 45 HP gas.
Stiff-leg Derrick 10 tons, 100' boom.
Stiff-leg Derrick 10 tons, 100' bm. with elec. hoist.

BOILERS

125 HP loco. steam boiler 125# 50 HP vertical full code boiler
2—150 HP HRT full code boilers.

BINS—FLOOR HOPPERS

200 tons all steel single compt. bin.
4—Wood Hoppers, single compt. 35 tons.
3—Wood Hoppers, single compt. 45 tons.
3—Wood Hoppers, single compt. 10 tons.
4—30" square hoppers for concrete
6—24" square and round hoppers
4—24" square double hoppers
1—Britches for double discharge

AIR COMPRESSORS

Sullivan 1270 c.f.m. electrical.
Sullivan WN3, 1051 c.f.m. Diesel.
I.R. 430 c.f.m. Portable, gas.
I.R. 310 cu. ft. Portable.
I.R. 220 cu. ft. Portable, gas.
Sullivan 110 cu. ft. Portable, gas.
American 425 c.f.m. 50# electric.

MISCELLANEOUS

Austin Model 600 Trencher [illegible] 28".
Steel Building port. 30 x 60 [illegible] doors.
Steel Building 54" x 102" [illegible] ors.
15" x 30" Traylor Rock Crush[illegible]
36—4 yd. side dump cars, 36" [illegible]
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Vibrating Screen, two deck, 4 [illegible] 10.
Sheeps-Foot Roller, 2 drum[illegible]
20—Battleship buckets, 2½-3 [illegible]
20—Steel Stone Skips, 2 & 3 [illegible]
C. H. & E. saw tables, electric driven.
Barber-Greene, #62, bucket [illegible]
I.R. Model 50, drill sharpener[illegible]
Generator Sets, electric and die[illegible] drive.
3—Tanks, 20,000 gals. with steam coils.
Portable Steel Building [illegible] x 60
Burch Belt Conveyor 24" x 2[illegible]
Haiss 50 ton Trailer, new solid tires
Fruehauf 40 ton Trailer, Mack Tractor
3—R.R. Flat Cars, 40', 50 ton[illegible]
200 tons Structural Steel Building beams
Otis Runabout Crane, solid tires
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250' Concrete Trimie 10", 12" and 14".

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1—#9-B-2 McKiernan & Terry.
1—#7 McKiernan & Terry.
3—#5 McKiernan & Terry.
3—#3 McKiernan & Terry.

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CRANE-SHOVEL -BACKHOE

1—17-ton cap. Link-Belt Gas Crawler Crane, Model K-30, Shop #1531, new late 1936, 60' Bm. just completely rebuilt, also 1-yd. Shovel attach. Immediate shipment. (For sale or rent)

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1—43-B Bucyrus-Erie Gas Crane & Dragline, 60' Bm. 1½-yd. Dragline Bucket, also 1-¾-yd. Shovel attach. (Rent only)

4—10 ft. & 15 ft. Lorain-40 pin-connected Boom Sections with guy cables. (New)

1—Lorain Special Shovel Boom 16' lg. & Stick 14' lg. for tunnel service, fits L-75, 77, 79 or 80. (For rent)

1—General Diesel Crawler Backhoe, ⅝-yd. Bucket 36" wide, excellent cond. (For sale or rent)

1—Lorain 75-B Gas Backhoe 1-yd. (For rent)

1—Lorain-40 Single Purpose Trailer pneumatics excellent.

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Boiler, V. T. 54"x112" ASME
Byers Model 40 Shovel ⅜ yd.
Erie B-2 Steam Crane
27E Smith Paver with boom also tower
Compressors 389' 600' V-Belt Drive
Eimco Tunnel Shovels 12B. 20
McK-Terry Pile Hammers 3, 6, 7
Barber-Greene 42 Bucket loader
Sullivan Turbinair hoist 2000#
1¼ Northwest Shovel Attachment
1¼ Bucy-Erie 41B Shovel Attachment
4—Union Round shaft buckets
Haiss Bucket Loader
40 ft. Erie B-2 Crane Boom
Electric Hoists 50, 60 100 HP
2—15 Ton Steel Guy Derricks 100 boom
Pumps 3, 4, 6" Gas electric and air
14 ton 36" Ga. Vulcan Loco S. Tank
3—12 Ton 36" Ga. Whitcomb Gas Locos.
4 Ton 24" Ga. Mancha Bat. Loco.
40 ft. Steel Pile Leads
17-40 cu. ft. 24" Ga. Tunnel Cars

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Model 3, 5 & 6 Northwest Draglines
1¼ yd. Northwest Combination Shovel and Crane.
Model 1500 Speed Crane 65' boom
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¾ yd. Koehring and 1 yd. P & H Shovel Fronts
3—160' Portable Air Compressors
4—Double Drum gasoline Hoists
9 x 10 & 8¼ x 10 three drum American Hoists
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1—#5, 6, 7 & 9B-2 McKiernan-Terry Hammers
3—25 ton stiff leg Derricks
15 and 25 ton Locomotive Cranes
1—New 40, 50, 60 h.p. ASME 125# Vertical Boilers
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ALL STANDARD GAUGE EQUIPMENT

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One 4-Wheel Steam Saddle Tank..30 ton
One 4-Wheel Steam Saddle Tank..39 ton
One 4-Wheel Steam Saddle Tank..50 ton

SWITCHERS

One 4-Wheel Std. with Tender....40 ton
One 6-Wheel Std. with Tender....52 ton
One 6-Wheel Std. with Tender....68 ton
Two 6-Wheel Std. with Tender....71 ton

ROAD

Two 6-Wheel MOGUL 2-6-0..52 & 56 tons
Two 8-Wheel CONSOLIDATED....82 tons

ALSO ATLANTIC & SANTA FE TYPE ENGINES

Also: Hopper, Gondola, Flat and Box Cars

Steam and Crawler Type Gasoline Cranes

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Steel Guy Derricks, 7½ to 50 tons capacity
A.C. Electric Double Drum Hoists, 80 to 120 h.p.
Double Drum Steam Hoists
Stiff Leg Derricks
Compressors
Every kind of construction equipment

Attractively priced for quick sale or rent.

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1—12-Ton, 36" Plymouth Gas Loco.
2—36" Gauge Nordberg Track Shifters

Dump Cars, Locomotive Cranes, Shovels and General Construction Equipment.

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1—3 Drum Steam Hoist (Boiler Inspected)

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Conc. mixers, 3½ cu. ft. to 1½ yd. gas or elect. power with side loaders, or batch hoppers.

TRUCK MIXERS

3—1½ yd. Jaeger Truck concrete mixers, with 4 cyl. LeRoi gasoline engines.

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—But the pliers, the nut and the job will all suffer. For best results at lowest cost use tools that fit the job. E.C.A. Sells and Rents *all* kinds and *all* makes of construction equipment. Their advice is impartial and their equipment does the job right.

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Lidgerwood 15 ton cap. steam powered cableway, Span 2375' cable complete. Steel, head and tail towers 150' high.

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30—Portable gasoline driven air compressors, all makes, these sizes, 310 ft., 260 ft., 220 ft., 160 ft., and 110 ft.

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4—1—150 Blaw Knox bins; 1—35 ton Blaw Knox, 3—30 ton Johnson. All 2 comp., except 72 ton.

BUCKETS

26—Clamshell, all sizes and types; Williams, Blaw Knox and Owen.
1—2¼ yd. Bucyrus-Erie.
10—Dragline; 1—3 yd. Blaw Knox; 1—2¼ yd. Bucyrus-Erie; 1—1½ yd. Omaha; 1—1¼ yd. Page; 1—1 yd. Hayward; 1—⅝ yd. Williams.
1—1½ yd. Pioneer Cableway Excavator bucket.
8—Dragscraper; 1—2½ yd. Green 2—1 yd. Sauerman; 1—1 yd. Green; 1—¾ yd. Garst; 2—½ yd. Garst.

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1—Link Belt, K-48, Ser. No. 1728, 60' boom, 2 yd. bucket.
1—Northwest Model No. 5 Ser. No. 3572, 50' boom with 1¼ yd. pull shovel attachment.
1—P&H, MDL. 655A Diesel, 50' boom, 1½ yd. shovel front.
1—Lorain 77B, Diesel, Ser. #9163, 1½ yd. shovel.
1—Link-Belt model K-42, Ser. No. 1265, 45' boom, 1¼ yd. bucket, also 1 yd. trench hoe att. or 1¼ yd. shovel front.
1—Northwest model 104, Ser. No. 1386, 45' boom, 1¼ yd. bucket; with 1 yd. shovel attachment.
1—P&H Mdl. 650, with 1¼ yd. shovel front.
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1—Osgood "Commander" ⅝ yd., 30' boom, Ser. No. 2403 with ⅝ yd. bucket.
1—Thew ¾ yd. Gasoline Shovel with ¾ yd. shovel front and 40 ft. crane boom, Serial No. 2801.
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1—Byers Bearcat model 27, No. 5289, 30' boom, ½ cl. sw. ½ yd. bucket.
1—Erie Steam Crane, 40' boom with or without ¾ yd. shovel front.

DERRICKS

3—All steel stiff leg derricks: 1—15-ton Just with 65' boom; 1—5-ton American with 75' boom. 1—5-ton American with 75' boom.
7—Steel Guy Derricks; 5—20-ton American-Terry 90' mast, 80' boom; 1—15-ton Terry with 115' mast, 100' boom; with 16' bull wheels; 1—6-ton Bedford with 90' mast, 80' boom

HOISTS (Elec., Gas, Steam)

55—Electric ranging from 20 HP up to 125 HP, consisting of triple-drum, double-drum and single-drum, with AC or DC motors, some with attached swingers. Following makes: Amer., Clyde, Lambert, Lidgerwood and Nat. Gas hoists ranging from 8 to 120 HP, single, double and triple-drums; all standard makes. (38 in stock.)
Steam ranging from 8 HP to 60 HP, single, double and triple-drum, all standard makes.

PNEUMATIC TOOLS

150—Pneu. Tools, chipping & riveting hammers, concrete breakers, air, column & tripod drills, spades, vibrators, and wood borers.

PUMPS

135—Centrifugal from 12" to 2" suc. cap 5000 to 300 G. P. M., elect. and gasoline.
125—Pumps all kinds, diaphragm Lift & Force, duplex, triplex, quadruple and sextuple, also Pulsometer.

TRACTORS

2—Allis Chalmers, Mdl. L 12 ton, #637, 684, with Baker Hyd. Bulldozers.
1—Allis Chalmers, Mdl. 75, Ser. #7049, 12 ton gas powered.
4—Caterpillar, 1 Mdl. 65 1 Mdl. 60 12 tons; 2—mod. 30, 5 ton, 1 with derrick attach.
1—Allis Chalmers, Mdl. WM, 5 ton with Frank G. Hough hyd. front end loader.

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CONVEYOR and TRANSMISSION BELTING

CONVEYOR BELTING
ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"
42"	5	1/8"	1/16"
36"	6	1/8"	1/16"
30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

TRANSMISSION BELTING
HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

ELEVATOR BELTING
HEAVY DUTY RUBBER COVERED

Width	Ply	Top-Bottom	Covers
12"	6	1/16"	1/16"
14"	6	1/16"	1/16"
16"	6	1/16"	1/16"
18"	6	1/16"	1/16"

ENDLESS "V" BELTS

"A" — WIDTH — All Sizes
"B" — WIDTH — All Sizes
"C" — WIDTH — All Sizes
"D" — WIDTH — All Sizes
"E" — WIDTH — All Sizes

Sold in Matched Sets

RUBBER HOSE
ALL SIZES FOR AIR — WATER — STEAM — SUCTION — FIRE — WELDING ETC.

Inquire For Prices :—: Mention Size and Lengths

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2—9x10 Triple Drum Mead-Morrison
1—8¼x10 Triple Drum Lidgerwood
1—8¼x10 Double Drum Lambert
1—16x18 Single Drum Flory
1—8x8¼ Single Drum Lidgerwood Dock Winch
4—5½x8 Independent Lambert Swinging Gears, 6,000 lbs.
1—6x8 Independent Lidgerwood Swinging Gear, 8,000 lbs.

ELECTRIC HOISTS

2—100 H.P. American Double Drums
1—80 H.P. Thomas Triple Drum
1—80 H.P. Clyde Triple Drum
5—80 H.P. Lambert Double Drums
2—60 H.P. Maine Triple Drums
3—60 H.P. Lidgerwood Double Drums
1—125 H.P. Clyde Single Drum Shaft

A.C. SLIP RING MOTORS
3 phase, 60 cycle, 220 volt

4—125 H.P. G.E. MTC, 720 RPM
2—100 H.P. G.E. MTC, 720 RPM
3—100 H.P. G.E. MTC, 720 & 900 RPM
10—80 H.P. G.E. MTC, 600-720-900 RPM
30—60 H.P. G.E. MTC, 600-720-900 RPM
25—50 H.P. G.E. MTC, 600-720-900 RPM
25—30, 35, 40 H.P., G.E. MTC, 600 to 900 RPM

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Serving the Construction Industry for over 50 years
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Four Koppel 1½-yd. V-cars 24" gauge
Whitcomb 6-ton gas loco., 24" gauge
18-ton Orton 8-wheel locomotive crane
Bucyrus-Erie 43-B comb. shovel & crane
Bucyrus-Erie 50-B 1½-yd. steam dragline
Two Browning 10-ton 10-wh. truck cranes
P. & H. 10-wheel truck crane 50' boom
Browning 1½-yard rehandling bucket
HOISTING MACHINERY CO.
50 Church Street New York

ELECTRIC PUMPS
Ingersoll-Rand

1—2" 20 HP Type RVH 250 GPM 230 ft. head
2—3" 30 HP Type RVH 450 GPM 200 ft. head
1—3" 40 HP Type RVH 500 GPM 220 ft. head
1—2" LaBour 10 HP
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1—Erie aggremeter 75 ton 3 compartment with scales and batcher.

BOILER
1—100 Scotch Marine type complete.

BUCKETS
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2—Page dragline buckets 1 yd. and 1¼ yd. capacity.
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1—Bucket Elevator with steel buckets 14 x 14 x 7" on heavy duty single chain complete with all chains, sprockets, etc. 40' centers mounted on wood frame.

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8 x 16 up to and including 48 x 60.

CRUSHER SPECIAL
1—Traylor 42" x 48" capacity per hr. 260 tons at 8" or 118 tons to 2" managanese fitted, perfect condition, immediate delivery. Located Bangor, Maine.
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1—Industrial Brownhoist 15 ton capacity 50' boom 100 H.P. Buda motor double drums for clamshell work.

HOISTS MINE TYPE
2—Single drum electric for shaft or slope, 84" dia. 60" face, 150 HP 2200 volt AC, used only 11 months.

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1—Shepard 10 ton capacity 36' span 230 volt direct current, bucket operating, with or without 3 yd. clamshell bucket.

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1—O & S 22 ton steam, std. gauge 8 wheel, double drums for clamshell work, 55' boom, ASME boiler, 125 lbs. working pressure. Shop No. 44965.

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1—American 42 ton 4 wheel std. gauge saddle tank, cylinders 14 x 22, 190 lbs. working pressure, ASME boiler.
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1—Vulcan 21 ton steam, air brakes, std. gauge.

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2—45 ton Heisler geared locomotives 36" gauge.
8—Plymouth and Whitcomb 4, 7, 8, 14, 16, 20 ton 24" and 36" gauge.

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1—Allis Chalmers stripping pump 600 GPM 450' head, 1760 RPM 400 lbs. pressure, 125 HP 440 volt motor.
2—6" vertical electric pumps with 25 HP AC 220-440 volt motors for sump work.

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4	Model AA	3 " discharge, Double Stage
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1—Mundy—50 H.P.

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Clam Shell, Drag-line and Rehandling, from ½ to 3½ yd. capacities. Various makes.

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CRANES
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2—Lorain "77", 60' Boom, 15' Ext. and Fair Leads for Drag-line.
1—Lorain "79" with 60' Boom, 15' Ext. Combination.
1—P & H 620 Combination, 60' Boom with Drag-line Bucket and Fair Leads.

DRAG-LINES
2—Lorain "77" Diesel, 1½ yd., 60' Boom, 15' Ext.
1—Lorain "79" Diesel, 1¾ yd., 70' Boom.
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50—Centrifugal, Self Priming, Marine, Deep Well, Push and pull, Diesel and Gas. All types, capacities.

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1—Acme 6-ton with scarifier.
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ROLLERS—SHEEPS FOOT
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